

QK
396
F632
BOT

FLORA OF SOUTHERN AFRICA

VOLUME 5

Editor O.A. Leistner



Part 3 Dracaenaceae, Asparagaceae, Luzuriagaceae and Smilacaceae

by A.A. Obermeyer, K.L. Immelman and J.J. Bos

National Botanical Institute

FLORA OF SOUTHERN AFRICA

which deals with the territories of

SOUTH AFRICA, CISKEI, TRANSKEI, LESOTHO, SWAZILAND, BOPHUTHATSWANA,
NAMIBIA, BOTSWANA AND VENDA

VOLUME 5 PART 3

DRACAENACEAE, ASPARAGACEAE, LUZURIAGACEAE AND SMILACACEAE

by

A.A. Obermeyer, K.L. Immelman and J.J. Bos

Scientific editor O.A. Leistner
Technical editor E. du Plessis



NATIONAL
*B*OTANICAL
INSTITUTE

Pretoria
1992



Editorial Board

B.J. Huntley	National Botanical Institute, Cape Town, RSA
R.B. Nordenstam	Natural History Museum, Stockholm, Sweden
R.M. Polhill	Royal Botanic Gardens, Kew, UK
J.J.A. van der Walt	University of Stellenbosch, Stellenbosch, RSA

Co-workers on this issue

H.F. Glen, NBI, Pretoria: Latin descriptions

Wilma Roux, NBI, Pretoria: plotting distribution areas on maps

Typeset by S.S. Brink, NBI, Pretoria

Printed by Execuprint Printers, Adriana Crescent, Gateway Industrial Park, Verwoerdburg

Copyright ©, published by and obtainable from the
National Botanical Institute, Private Bag X101, Pretoria, 0001 Republic of South Africa

ISBN 1-874907-02-1

CONTENTS

New taxa and new combinations published in Volume 5 Part 3	iv
Introduction	v
Plan of <i>Flora of southern Africa</i>	vi
Key to families in this part	viii
DRACAENACEAE	1
Dracaena by J.J. Bos	1
Sansevieria by A.A. Obermeyer	5
ASPARAGACEAE	11
Protasparagus by A.A. Obermeyer & K.L. Immelman	11
Myrsiphyllum by A.A. Obermeyer	71
LUZURIAGACEAE	83
Behnia by A.A. Obermeyer	83
SMILACACEAE	85
Smilax by A.A. Obermeyer	85
Index	87

NEW TAXA AND NEW COMBINATIONS PUBLISHED IN VOLUME 5

PART 3*

- Protasparagus** subgen. **Suaveolens** *Oberm.*, subgen. nov., p. 13
- Protasparagus** subgen. **Protasparagus** series **Exuviali** *Oberm.*, series nov., p. 16
- Protasparagus** subgen. **Protasparagus** series **Globosi** *Oberm.*, series nov., p. 18
- Protasparagus** subgen. **Protasparagus** series **Penduli** *Oberm.*, series nov., p. 14
- Protasparagus** subgen. **Protasparagus** series **Retrofracti** *Oberm.*, series nov., p. 15
- Protasparagus** subgen. **Protasparagus** series **Sympodioidi** *Oberm.*, series nov., p. 19
- Protasparagus** subgen. **Suaveolens** series **Suaveolens** *Oberm.*, series nov., p. 13
- Protasparagus** **aggregatus** *Oberm.*, sp. nov., p. 55
- Protasparagus** **bayeri** *Oberm.*, sp. nov., p. 21
- Protasparagus** **biflorus** *Oberm.*, sp. nov., p. 63
- Protasparagus** **clareae** *Oberm.*, sp. nov., p. 54
- Protasparagus** **coddii** *Oberm.*, sp. nov., p. 53
- Protasparagus** **devenishii** *Oberm.*, sp. nov., p. 41
- Protasparagus** **divaricatus** *Oberm.*, sp. nov., p. 67
- Protasparagus** **edulis** *Oberm.*, sp. nov., p. 41
- Protasparagus** **exsertus** *Oberm.*, sp. nov., p. 29
- Protasparagus** **filicladus** *Oberm.*, sp. nov., p. 51
- Protasparagus** **flavicaulis** *Oberm.*, sp. nov., p. 29
- Protasparagus** **fouriei** *Oberm.*, sp. nov., p. 62
- Protasparagus** **fractiflexus** *Oberm.*, sp. nov., p. 40
- Protasparagus** **graniticus** *Oberm.*, sp. nov., p. 42
- Protasparagus** **intricatus** *Oberm.*, sp. nov., p. 65
- Protasparagus** **lynetteae** *Oberm.*, sp. nov., p. 47
- Protasparagus** **mariae** *Oberm.*, sp. nov., p. 24
- Protasparagus** **mollis** *Oberm.*, sp. nov., p. 32
- Protasparagus** **nodulosus** *Oberm.*, sp. nov., p. 59
- Protasparagus** **oliveri** *Oberm.*, sp. nov., p. 30
- Protasparagus** **pendulus** *Oberm.*, sp. nov., p. 32
- Protasparagus** **recurvispinus** *Oberm.*, sp. nov., p. 19
- Protasparagus** **sekukuniensis** *Oberm.*, sp. nov., p. 63
- Protasparagus** **transvaalensis** *Oberm.*, sp. nov., p. 52
- Protasparagus** **flavicaulis** subsp. **setulosus** *Oberm.*, subsp. nov., p. 30
- Protasparagus** subgen. **Protasparagus** series **Africani** (*Bak.*) *Oberm.*, comb. et stat. nov., p. 15
- Protasparagus** subgen. **Protasparagus** series **Racemosi** (*Bak.*) *Oberm.*, comb. et stat. nov., p. 16
- Protasparagus** **concinus** (*Bak.*) *Oberm.* & *Immelman*, comb. et stat. nov., p. 61
- Protasparagus** **exuvialis** forma **ecklonii** (*Bak.*) *Oberm.*, comb. et stat. nov., p. 43
- Protasparagus** **spinescens** (*Steud. ex Roem. & Schult.*) *Oberm.*, comb. et stat. nov., p. 27
- Dracaena** **aletriformis** (*Haw.*) *Bos*, comb. nov., p. 3
- Protasparagus** **bechuanicus** (*Bak.*) *Oberm.*, comb. nov., p. 33
- Protasparagus** **burchellii** (*Bak.*) *Oberm.*, comb. nov., p. 27
- Protasparagus** **confertus** (*Krause*) *Oberm.*, comb. nov., p. 51
- Protasparagus** **densiflorus** (*Kunth*) *Oberm.*, comb. nov., p. 49
- Protasparagus** **lignosus** (*Burm. f.*) *Oberm.*, comb. nov., p. 37
- Protasparagus** **mucronatus** (*Jessop*) *Oberm.*, comb. nov., p. 38
- Protasparagus** **stellatus** (*Bak.*) *Oberm.*, comb. nov., p. 61
- Protasparagus** **virgatus** (*Bak.*) *Oberm.*, comb. nov., p. 31

* Date of publication: November 1992

INTRODUCTION

The family delimitation in this part follows Dahlgren *et al.* (1985)*. The numbering and the sequence of genera are, however, still according to De Dalla Torre & Harms in their *Genera Siphonogamarum* (1900–1907).

Localities are sometimes referred to in terms of the degree reference system (Leistner & Morris in *Annals of the Cape Provincial Museums* 12: 1–565; 1976).

Cited voucher specimens given without indication of herbarium are housed in PRE (National Herbarium, Pretoria).

The distribution areas shown on maps in this part represent the distribution of the taxon concerned only in the region covered by this flora.

This part was compiled in accordance with the Guide for Contributors to the *Flora of southern Africa* (compiled by Leistner, Ross & De Winter and available from the Editor, National Botanical Institute, Private Bag X101, 0001 Pretoria).

* Dahlgren, R.M.T., Clifford, H.T. & Yeo, R.F. 1985. *The families of the Monocotyledons*. Springer-Verlag, Berlin, Heidelberg, New York, Tokyo.

PLAN OF *FLORA OF SOUTHERN AFRICA*

Cryptogam volumes will in future not be numbered, but will be known by the name of the group they cover. The number assigned to the volume on Charophyta therefore becomes redundant.

Exotic families are marked with an asterisk.

Published volumes and parts are shown in italics.

INTRODUCTORY VOLUMES

The genera of southern African flowering plants

Vol. 1: *Dicotyledons* (published 1975)

Vol. 2: *Monocotyledons* (published 1976)

Botanical exploration of southern Africa (published 1981)

CRYPTOGAM VOLUMES

Charophyta (published as Vol. 9 in 1978)

Bryophyta: Part 1: Mosses: Fascicle 1: *Sphagnaceae–Grimmiaceae* (published 1981)

Fascicle 2: *Gigaspermaceae–Bartramiaceae* (published 1987)

Fascicle 3: *Erpodiaceae–Hookeriaceae*

Fascicle 4: *Fabroniaceae–Polytrichaceae*

Pteridophyta (published 1986)

FLOWERING PLANTS VOLUMES

Vol. 1: *Stangeriaceae, Zamiaceae, Podocarpaceae, Pinaceae**, *Cupressaceae, Welwitschiaceae, Typhaceae, Zosteraceae, Potamogetonaceae, Ruppiaceae, Zannichelliaceae, Najadaceae, Aponogetonaceae, Juncaginaceae, Alismataceae, Hydrocharitaceae* (published 1966)

Vol. 2: *Poaceae*

Vol. 3: *Cyperaceae, Arecaceae, Araceae, Lemnaceae, Flagellariaceae*

Vol. 4: Part 1: *Restionaceae*

Part 2: *Xyridaceae, Eriocaulaceae, Commelinaceae, Pontederiaceae, Juncaceae* (published 1985)

Vol. 5: Part 1: *Colchicaceae, Eriospermaceae, Asphodelaceae*

Part 2: *Alliaceae, Liliaceae**, *Hyacinthaceae*

Part 3: *Dracaenaceae, Asparagaceae, Luzuriagaceae, Smilacaceae* (published 1992)

Vol. 6: *Haemodoraceae, Amaryllidaceae, Hypoxidaceae, Tecophilaceae, Velloziaceae, Dioscoreaceae*

Vol. 7: *Iridaceae*: Part 1: *Nivenioideae, Iridoideae*

Part 2: *Ixioidae*: Fascicle 1

Fascicle 2: *Syringodea, Romulea* (published 1983)

Vol. 8: *Musaceae, Strelitziaceae, Zingiberaceae, Cannaceae**, *Burmanniaceae, Orchidaceae*

Vol. 9: *Casuarinaceae**, *Piperaceae, Salicaceae, Myricaceae, Fagaceae**, *Ulmaceae, Moraceae, Cannabaceae**, *Urticaceae, Proteaceae*

Vol. 10: Part 1: *Loranthaceae, Viscaceae* (published 1979)

Santalaceae, Grubbiaceae, Opiliaceae, Olacaceae, Balanophoraceae, Aristolochiaceae, Rafflesiaceae, Hydnoraceae, Polygonaceae, Chenopodiaceae, Amaranthaceae, Nyctaginaceae

Vol. 11: *Phytolaccaceae, Aizoaceae, Mesembryanthemaceae*

Vol. 12: *Portulacaceae, Basellaceae, Caryophyllaceae, Illecebraceae, Cabombaceae, Nymphaeaceae, Ceratophyllaceae, Ranunculaceae, Menispermaceae, Annonaceae, Trimeniaceae, Lauraceae, Hernandiaceae, Papaveraceae, Fumariaceae*

Vol. 13: *Brassicaceae, Capparaceae, Resedaceae, Moringaceae, Droseraceae, Roridulaceae, Podostemaceae, Hydrostachyaceae* (published 1970)

Vol. 14: *Crassulaceae* (published 1985)

Vol. 15: *Vahliaceae, Montiniaceae, Escalloniaceae, Pittosporaceae, Cunoniaceae, Myrothamnaceae, Bruniaceae, Hamamelidaceae, Rosaceae, Connaraceae*

- Vol. 16: Fabaceae: Part 1: *Mimosoideae* (published 1975)
 Part 2: *Caesalpinioideae* (published 1977)
 Part 3: Papilionoideae: Fascicle 1: Swartzieae—Robinieae
 Fascicle 2: Indigofereae
 Fascicle 3: Desmodieae, Phaseoleae
 Fascicle 4: Psoraleae—Galegeae
 Fascicle 5: Loteae—Liparieae
 Fascicle 6: *Crotalarieae (Aspalathus)* (published 1988)
 Fascicle 7: *Crotalarieae (Bolusia—Lebeckia)*
 Fascicle 8: *Crotalarieae (Lotononis—Wiborgia)*
 Fascicle 9: *Crotalarieae (Pearsonia—Argyrolobium)*, Genisteae (*Cytisus—Ulex*)
- Vol. 17: Geraniaceae, Oxalidaceae
- Vol. 18: Part 1: Linaceae, Erythroxylaceae, Zygophyllaceae, Balanitaceae
 Part 2: Rutaceae
 Part 3: *Simaroubaceae, Burseraceae, Ptaeroxylaceae, Meliaceae (Aitoniaceae), Malpighiaceae* (published 1986)
- Vol. 19: Polygalaceae, Dichapetalaceae, Euphorbiaceae, Callitrichaceae, Buxaceae, Anacardiaceae, Aquifoliaceae
- Vol. 20: Celastraceae, Icacinaceae, Sapindaceae, Melianthaceae, Greyiaceae, Balsaminaceae, Rhamnaceae, Vitaceae
- Vol. 21: Part 1: *Tiliaceae* (published 1984)
 Malvaceae, Bombacaceae, Sterculiaceae
- Vol. 22: *Ochnaceae, Clusiaceae, Elatinaceae, Frankeniaceae, Tamaricaceae, Canellaceae, Violaceae, Flacourtiaceae, Turneraceae, Passifloraceae, Achariaceae, Loasaceae, Begoniaceae, Cactaceae* (published 1976)
- Vol. 23: Geissolomaceae, Penaeaceae, Oliniaceae, Thymelaeaceae, Lythraceae, Lecythidaceae
- Vol. 24: Rhizophoraceae, Combretaceae, Myrtaceae, Melastomataceae, Onagraceae, Trapaceae, Haloragaceae, Gunneraceae, Araliaceae, Apiaceae, Cornaceae
- Vol. 25: Ericaceae
- Vol. 26: *Myrsinaceae, Primulaceae, Plumbaginaceae, Sapotaceae, Ebenaceae, Oleaceae, Salvadoraceae, Loganiaceae, Gentianaceae, Apocynaceae* (published 1963)
- Vol. 27: Part 1: Periplocaceae, Asclepiadaceae (*Microlooma—Xysmalobium*)
 Part 2: Asclepiadaceae (*Schizoglossum—Woodia*)
 Part 3: Asclepiadaceae (*Asclepias—Anisotoma*)
 Part 4: *Asclepiadaceae (Brachystelma—Riocreuxia)* (published 1980)
 Asclepiadaceae (remaining genera)
- Vol. 28: Part 1: Cuscutaceae, Convolvulaceae
 Part 2: Hydrophyllaceae, Boraginaceae
 Part 3: Stilbaceae, Verbenaceae
 Part 4: *Lamiaceae* (published 1985)
 Part 5: Solanaceae, Retziaceae
- Vol. 29: Scrophulariaceae
- Vol. 30: Bignoniaceae, Pedaliaceae, Martyniaceae, Orobanchaceae, Gesneriaceae, Lentibulariaceae, Acanthaceae, Myoporaceae
- Vol. 31: Part 1: Fascicle 1: Plantaginaceae, Rubiaceae (*Rubioideae—first part*)
 Fascicle 2: *Rubiaceae (Rubioideae—second part): Paederieae, Anthospermeae, Rubieae* (published 1986)
 Fascicle 3: Ixoroideae, Chinchonoideae
 Part 2: Valerianaceae, Dipsacaceae, Cucurbitaceae
- Vol. 32: Campanulaceae, Sphenocleaceae, Lobeliaceae, Goodeniaceae
- Vol. 33: Asteraceae: Part 1: Lactuceae, Mutisieae, 'Tarchonantheae'
 Part 2: Vernonieae, Cardueae
 Part 3: Arctotideae
 Part 4: Anthemideae
 Part 5: Astereae
 Part 6: Calenduleae
 Part 7: Inuleae: Fascicle 1: Inulinae
 Fascicle 2: *Gnaphaliinae (first part)* (published 1983)
 Part 8: Heliantheae, Eupatorieae
 Part 9: Senecioneae

KEY TO FAMILIES IN THIS PART

- 1a Flowers unisexual; plants dioecious; leaves with 2 basal tendrils **Smilacaceae** (p. 85)
- 1b Flowers bisexual; leaves without tendrils:
 - 2a Plants with a thick aerial stem (with secondary growth) or leaves very tough and fleshy; seeds light-coloured **Dracaenaceae** (p. 1)
 - 2b Plants with slender, often scandent aerial stems (without secondary growth); leaves often rudimentary, never very tough and fleshy; seeds black:
 - 3a Leaves reduced to scales with a spiny or soft spur; cladodes needle-shaped or leaf-like and without distinct cross-connections between the parallel veins ... **Asparagaceae** (p. 11)
 - 3b Leaves with numerous prominent parallel veins with distinct cross-connections **Luzuriagaceae** (p. 83)

DRACAENACEAE

Shrubs, trees or rhizomatous xerophytic perennials. *Leaves* spirally arranged, often in rosettes and crowded at the base or the top of the stem, entire, with parallel venation, stiff, often succulent. *Flowers* in racemes or panicles, more or less regular, bisexual, hypogynous; pedicels with an equal, often disc-like articulation. *Tepals* 3 + 3, petal-like, united into a short to very long tube. *Stamens* 3 + 3, inserted at base of lobes, exserted; filaments filiform to inflated; anthers versatile, introrse. *Ovary* superior, trilocular with a single axile ovule in each locule; style slender; stigma capitate. *Fruit* a berry; seeds 1–3, dirty white.

Genera 1 or 2 (depending on whether *Dracaena* and *Sansevieria* are kept separate) with about 120 species; mainly in the Old World tropics.

Key to genera (from Dyer 1976)

Trees or shrubs; leaves in dense apical rosettes or cauline, usually herbaceous; inflorescence paniculate 1. **Dracaena**
Rhizomatous herbs, rarely short-stemmed; leaves basal, distichous, usually thick and fibrous; inflorescence a
dense cylindrical raceme 2. **Sansevieria**

1109
1. DRACAENA
by J.J. Bos*
(Literature references on p. 4)

Dracaena L., *Systema naturae* edn 12,2: 246 (1767a)/*Mantissa plantarum* 1: 63 (1767b); Bak.: 523 (1875); Bak.: 274 (1896); Bak.: 436 (1898); Bos: 14 (1984). Type species: *D. draco* (L.) L.

Pleomele Salisb.: 245 (1796) p.p. emend. N.E. Br.: 275 (1914). Type species: *P. fragrans* (L.) Salisb., i.e. *D. fragrans* (L.) Ker-Gawl.

Cordyline Planch.; auct. non Comm. ex Juss. (nom. cons.): 109 (1851). Type species: *C. reflexa* (Lam.) Planch., i.e. *D. reflexa* Lam.

Shrubs or trees. *Leaves* spirally arranged, often congested terminally in pseudo-whorls, strap- or sword-shaped, smooth, entire, acute with clasping bases. *Inflorescences* terminal panicles of simple or branched racemes; peduncle often with reduced leaves in transition to tiny scarious floral bracts. *Flowers* whitish, fragrant, nocturnal; pedicel consisting of a basal part turning into a persistent peg, and a stalk-like obconical receptacle persistent in fruit. *Perianth* tubular with six recurving lobes. *Stamens* inserted in the throat, opposite and equal to the lobes; filaments inflated. *Ovary* with a single ovule in each of the three locules; style filiform; stigma capitate. *Fruit* a globose or lobed orange-scarlet berry. *Seeds* 1–3, large, rounded, bony and dirty white.

A genus of about 60 species in the warmer regions of the world, notably Africa and South-east Asia, with two species recognized in southern Africa.

For characters not applicable in our area, see Bos: 14 (1984), as the constituent taxa in *Dracaena* tend to vary widely. A number of species is cultivated as ornamentals. Some of these can be grown very well in our area, but there is no evidence that any of them have established themselves here. They have been treated in Bos & Cullen: 285 (1986).

Although in our area species of *Dracaena* are not readily confused with those of *Sansevieria*, it should be noted that these genera cannot be separated in a satisfactory manner.

Well developed leaves longer than 0,5 m, with a distinct white cartilaginous edge; branches of the inflorescence green 1. *D. alectrifomis*
Well developed leaves shorter than 0,5 m, lacking a distinct white cartilaginous edge; branches of the inflorescence
yellow 2. *D. mannii*

* Department of Plant Taxonomy, Agricultural University, P.O. Box 8010, 6700 ED Wageningen, The Netherlands.



1. *Dracaena aletriformis* (Haw.) Bos, comb. nov.

Yucca aletriformis Haw.: 415 (1831). Type: Cape, Uitenhage, Van Stadens River, *Drège 4494a* (K!, neo., G!, MO!, P!, photocopies in PRE, WAG, here designated).

Cordylina rumphii Hook. (nom. illeg.) p.p. quoad descr., excl. syn.: t. 4279 (1847). *D. hookeriana* K. Koch (nom. illeg.): 394 (1861); Bak.: 527 (1875); Bak.: 275 (1896); Wood: t. 277 (1902); Coates Palgrave: 86 (1977). *D. rumphii* (Hook.) Regel excl. patria: 141 (1871). *Draco hookeriana* (K. Koch) Kuntze: 710 (1891). *Pleomele hookeriana* (K. Koch) N.E. Br.: 278 (1914). Type: Curtis's Botanical Magazine t. 4279 (here designated).

Dracaena latifolia Regel: 141 (1871); Saunders: t. 353 (1873). Type: Natal, Durban, *Wood 6572* (BM!, neo., E!, G!, PRC!, photocopies in PRE, WAG, here designated).

D. transvaalensis Bak.: 1001 (1904). Type: Transvaal, Shiluvane, *Junod 1635* (G!, holo., Z!, photocopies in PRE, WAG).

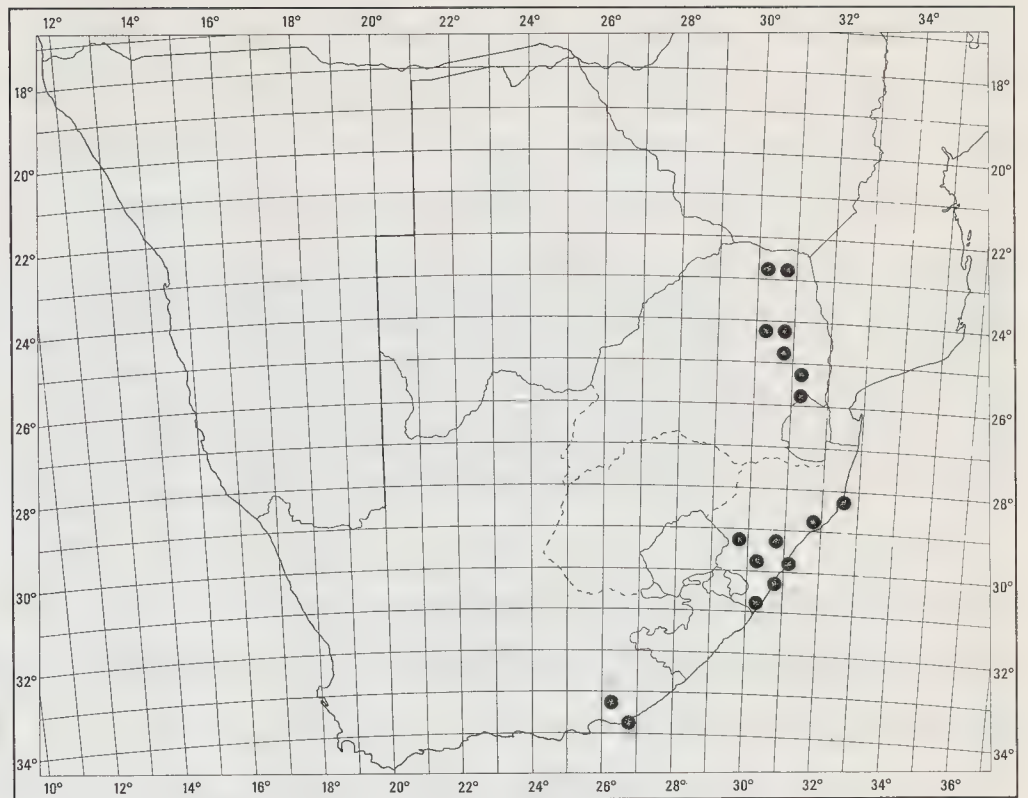
Sansevieria paniculata Schinz (nom. nud.): 141 (1892) based on: Cape, Port Alfred, *Schoenland 290* (Z!).

Misapplied name: *Aletris fragrans* L. (= *Dracaena fragrans* (L.) Ker-Gawl.) in Burm. f.: 10 (1768), vide Hutch.: 622 (1946), Bos: 75 (1984).

Small tree, not always branched, usually not exceeding 5 m. *Leaves* congested towards top of stems, narrow to broadly strap-shaped, with short flaring sheaths, bright to greyish green with narrow conspicuous white cartilaginous edges, 0,5–1,0 m long, 25–110 mm wide. *Inflorescence* erect, up to well over 1 m long, green. *Flowers* 1–4 together, more numerous in terminal clusters, 25–35(–42) mm long, greenish white; pedicel bases 5–10 mm long; receptacles 2–3 (–8) mm long, up to 12 mm in fruit. *Perianth* lobes $\pm 1,5$ times as long as tube. *Fruits* usually single-seeded and globose, lobed when 2- or 3-seeded, 7–19 mm in diameter, red or orange.

Distributed in Transvaal, Swaziland, Natal and the south-eastern Cape Province, also in Mozambique, Zanzibar and Kenya. Occasional in coastal bush and montane localities in Transvaal and Swaziland. Map 1.

Vegetatively distinct by its conspicuous white leaf edges, it is very variable in its leaf dimensions. Flower size may vary remarkably, even on the same plant in consecutive flowering periods. This has led to the distinction of several taxa that are, however, not tenable.



MAP 1.—*Dracaena aletriformis*

It is likely that the non-flowering living type plant in Kew Gardens, received from Bowie in 1823, was the one depicted on Plate 4279 of *Curtis's Botanical Magazine*. Cultivated herbarium material at K that was collected two decennia later, may very well have been taken from the same plant. However, I preferred to neotypify the name with material that was collected at Van Stadens River, the *locus classicus* where Bowie must have obtained his plant.

Vouchers: *Codd 8793* (BM!, EA, K!, PRE!, SRGH, photocopy WAG); *Compton 30421* (NBG!, photocopies in PRE, WAG); *Galpin 2960* (GRA!, PRE!, photocopy WAG); *Wood 6572* (BM!, E!, G!, PRE!, photocopy WAG); *Van der Schijff 5068* (PRE!, W!, photocopy WAG).

2. *Dracaena mannii* Bak. in *Journal of Botany* 12: 164 (1874); Bak.: 526 (1875); Bak.: 438 (1898); Bos: 82 (1984). Type: Nigeria, Old Calabar, *Mann 2339* (K!, lecto. vide Bos: 82 (1984), A!, B!, K!, P!, WAG! iso.).

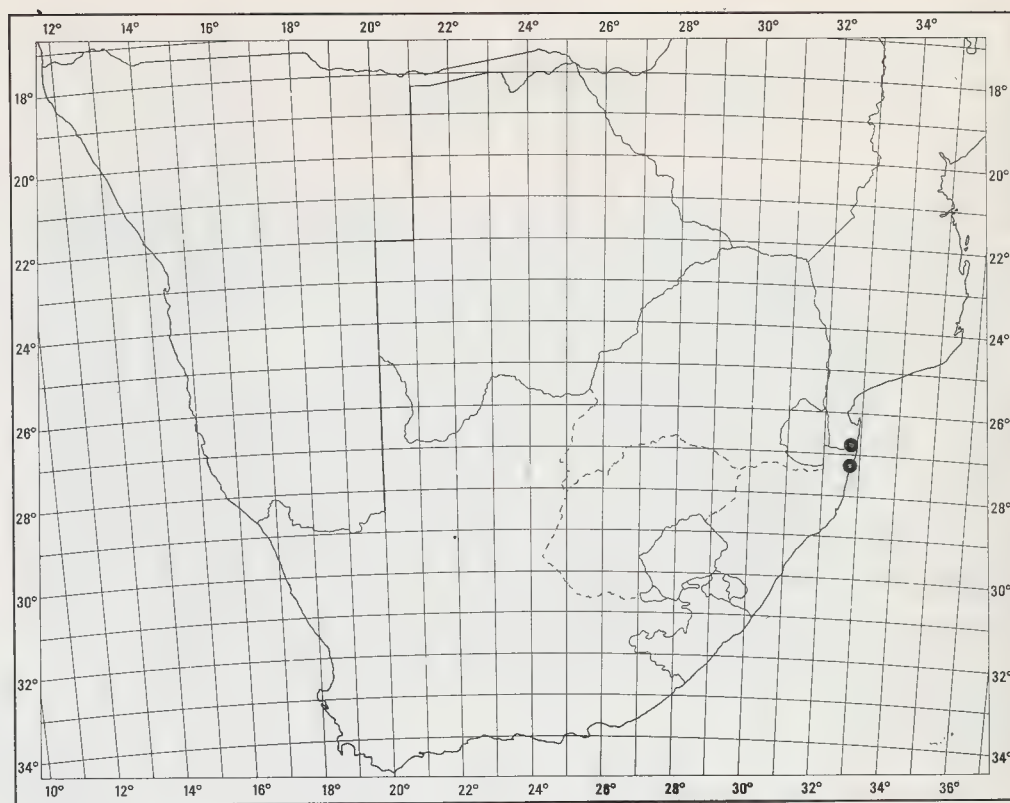
D. nitens Welw. ex Bak.: 252 (1877). *D. reflexa* Lam. var. *nitens* (Welw. ex Bak.) Bak.: 441 (1898); Coates Palgrave: 87 (1977). *Pleomele nitens* (Welw. ex Bak.) N.E. Br.: 278 (1914). Syntypes: Angola, Pungo Andongo, *Welwitsch 3741* (BM!, photos in MO, WAG); *Welwitsch 3742* (BM!), Golungo Alto, *Welwitsch 3743* (BM!, COI!, G!, K!, P!).

D. usambarensis Engl.: 30 (1894) nomen; Engl.: 144 (1895) descr.; Palmer & Pitman: 401 (1972). *P. usambarensis* (Engl.) N.E. Br.: 279 (1914). Syntypes: Tanzania, Usambara, *Volkens 65* (lost in B, photo K!); Kilimandscharo, *Volkens 1938* (lost in B, photos BR!, K!).

Shrub or tree, up to 5 m tall in our area; stem and branches with prominent leaf scars. *Leaves* narrowly oblong-elliptic with an abruptly flaring base clasping the stem for half its circumference, up to 400×20 mm. *Inflorescence* a panicle of simple racemes, not exceeding 0.5 m, yellow. *Flowers* greenish to creamy white, (9–)30–37 (–45) mm long; pedicel bases up to 4 mm, up to 9 mm in fruit; receptacles up to 2 mm long, up to 5 mm in fruit. *Perianth* lobes about twice as long as tube. *Fruits* turning first brown and subsequently scarlet when ripe, globose, 10–30 mm in diameter. *Seeds* globose, 7–20 mm in diameter. Figure 1.

Restricted to the banks of Kosi Bay in the extreme north-eastern corner of Natal. Widely distributed in tropical Africa from Senegal to Kenya and southwards to Angola and Mozambique. Map 2.

Quite variable in its characters, even on the same plant. In our area its flower size tends towards the upper limits set for the species. The height of the trees is rather modest



MAP 2.—*Dracaena mannii*

compared to the large trees found in Cameroun and Gabon that may surpass 30 m.

Vouchers: *Gerstner s.n.* (K!, PRE!, photocopy WAG); *Strey 10442* (K!, PRE!, photocopy WAG).

REFERENCES

- BAKER, J.G. 1874. On new Dracaenas from tropical Africa. *Journal of Botany*, new series 3: 164–167.
- BAKER, J.G. 1875. Revision of the species and genera of Asparagaceae. *Journal of the Linnean Society, Botany* 14: 508–632.
- BAKER, J.G. 1877. Report on the Liliaceae, Iridaceae, Hypoxidaceae and Haemadoraceae of Welwitsch's Angolan herbarium. *Transactions of the Linnean Society of London*, 2nd series 1, Botany: 245–273.
- BAKER, J.G. 1896. Liliaceae: *Dracaena*. In W.T. Thiselton-Dyer, *Flora capensis* 6: 274–275. Reeve, London.
- BAKER, J.G. 1898. Liliaceae: *Dracaena*. In W.T. Thiselton-Dyer, *Flora of tropical Africa* 7: 436–450. Reeve, London.
- BAKER, J.G. 1904. Beiträge zur Kenntnis der afrikanischen Flora 16: Liliaceae. *Bulletin de l'Herbier Boissier* Série 2, 4: 996–1002.
- BOS, J.J. 1984. *Dracaena* in West Africa. *Agricultural University Wageningen Papers* 84-1 = *Belmontia* n.s. 17 (1985): 1–126.
- BOS, J.J. & CULLEN, J. 1986. *Dracaena*. In S.M. Walters *et al.* (eds), *The European garden flora* 1: 285–287. Cambridge University Press, Cambridge.
- BROWN, N.E. 1914. Notes on the genera *Cordylina*, *Dracaena*, *Pleomele*, *Sansevieria* and *Taetsia*. *Bulletin of Miscellaneous Information*, Royal Botanic Gardens Kew 1914, 8: 273–279.
- BURMAN, N.L. 1768. *Prodromus florae capensis* in *Flora indica*. Haak, Leiden.
- COATES PALGRAVE, K. 1977. *Trees of southern Africa*. Struik, Cape Town.
- DYER, R.A. 1976. *The genera of southern African flowering plants* 2. Department of Agricultural Technical Services, Pretoria.
- ENGLER, A. 1894. Ueber die Gliederung der Vegetation von Usambara und der angrenzenden Gebiete. *Physikalische Abhandlungen der königlichen Akademie der Wissenschaften zu Berlin aus dem Jahre 1894* 1: 1–86.
- ENGLER, A. 1895. *Die Pflanzenwelt Ostafrikas und der Nachbargebiete*, Theil C. Reimer, Berlin.
- HAWORTH, A.H. 1831. Thirteenth decade of new succulent plants. *Philosophical Magazine and Annals* 1831: 414–424.
- HOOKER, W.J. 1847. *Cordylina rumphii*. *Curtis's Botanical Magazine*, 3rd series, 3: t. 4279.
- HUTCHINSON, J. 1946. *A botanist in southern Africa*. Gawthorn, London.
- KOCH, K. 1861. Die ächten Drachenbäume. *Wochenschrift für Gärtnerei und Pflanzenkunde* 4: 393–398.
- KUNTZE, O. 1891. *Revisio generum plantarum* 2. Felix, Leipzig.
- LINNAEUS, C. 1767a. *Systema naturae*, edn 12, 2. Stockholm.
- LINNAEUS, C. 1767b. *Mantissa plantarum*. Stockholm.
- PALMER, E. & PITMAN, N. 1972. *Trees of southern Africa* 1. Balkema, Cape Town.
- PLANCHON, J.E. 1851. *Cordylina* (*Dracaena* sp. auct.) *sieboldii* var. *maculata* & nouveaux détails sur la synonymie des plantes connues sous les noms de *Dracaena* et *Cordylina*. *Flore des Serres* 6: 109–111, 132–133, 135–138.
- REGEL, E. 1871. Die Arten der Gattung *Dracaena*. *Gartenflora* 20: 132–149.
- SALISBURY, R.A. 1796. *Prodromus stirpium in horto ad Chapel Allerton vigentium*. London.
- SAUNDERS, W.W. 1873. *Refugium botanicum* 5. Van Voorst, London.
- SCHINZ, H. 1892. In T. Durand & H. Schinz, *Conspectus florae africae* 5. Friedlaender & Sohn, Berlin.
- WOOD, J.M. 1902. *Natal plants* 3. Bennett & Davis, Durban.

1110 2. SANSEVIERIA

by A.A. OBERMEYER*
(Literature references on p. 9)

Sansevieria *Thunb.*, *Prodromus plantarum capensium* 65 (1794) (nom. cons.); *Thunb.*: 328 (1823); *Roem. & Schult.*: 355 (1829); *Roem. & Schult.*: 1678 (1830); *Benth. & Hook. f.*: 679 (1883); *Bak.*: 547 (1875); *Bak.*: 4 (1896); *Bak.*: 332 (1898); *N.E. Br.*: 185 (1915); *Krause*: 360 (1930); *Sölch & Roessl.*: 1 (1966); *R.A. Dyer*: 943 (1976). Type species: *S. thyrsiflora* (Petagna) *Thunb.*, nom. illegit. (*Aloe hyacinthoides* L., *S. hyacinthoides* (L.) *Druce*).

Acaulescent (in FSA region), coarse, evergreen, very drought-hardy perennials, strongly rhizomatous and forming colonies. *Rhizome* cylindrical, thick, fibrous, articulated, bearing clasping, thin, early deciduous cataphylls. *Roots* placed below or near aerial shoots. Leaves sessile, rosulate or distichous, one to few, flat or cylindrical or semicylindrical with a groove on adaxial side, plain or with irregular, transverse, darker and lighter green bands; juvenile leaves may differ in shape from mature ones. *Inflorescence* a spike-like raceme (in FSA region). *Flowers* numerous, subsessile, in irregular clusters along scape, opening haphazardly above and below, opening towards evening and for one night only, delicately scented. *Perianth* with a long, narrow tube, bulbous at base, with 6 spreading to recurved lobes. *Stamens* 6, erect, much exserted, fused to tube below; filaments filiform; anthers versatile. *Ovary* trilocular, ovoid, with a single, axile ovule in each locule; style long and filiform, at anthesis exserted early from closed perianth; stigma capitate. *Fruit* a berry, smooth or tuberculate, hollow inside with 1–3 bony, dirty white seeds covered with a thick, softly verrucose epidermis.

Species about 60, mostly tropical Africa, Asia. In the FSA region there are 4 species, all in the summer rainfall region. They occur in dry bushveld along the eastern escarpment, in the Lowveld, and westwards to Botswana and Namibia.

- 1a Flowers ± 150 mm long, in pseudocapitate racemes; northern Namibia and Angola 2. *S. longiflora*
- 1b Flowers up to 40 mm long, racemose; widespread or in eastern parts of South Africa:
 - 2a Leaves opposite, ± 5–9, cylindrical, with a narrow V-shaped groove on inside, epidermis smooth or somewhat longitudinally ribbed 4. *S. pearsonii*
 - 2b Leaves rosulate, with irregular transverse lighter green bands:
 - 3a Leaves ± 2–8, flat, lanceolate to linear; epidermis smooth 1. *S. hyacinthoides*
 - 3b Leaves numerous, V-shaped (half folded), lanceolate to linear, epidermis rough 3. *S. aethiopica*

1. **Sansevieria hyacinthoides** (L.) *Druce* in *The Botanical Society and Exchange Club of the British Isles Report for 1913*, 3: 423 (1914); *Wijnands*: 109 (1973); *Wijnands*: 138 (1983). *Iconotype*: t. 33 in *C. Commelin, Praeludia botanica* 84, t. 23 (1703).

Aloe hyacinthoides L.: 321 (1753). *Aletris hyacinthoides* (L.) L.: 456 (1762).

Aloe hyacinthoides var. *guineensis* L.: 321 (1753) (type variety). *Aletris hyacinthoides* var. *guineensis* (L.) L.: 456 (1762). *Aletris guineensis* (L.) *Jacq.*: 36 (1770). *S. guineensis* (L.) *Willd.*: 159 (1799); *Kunth*: 16 (1850); *Bak.*: 547 (1875); *Bak.*: 5 (1896).

S. thyrsiflora Petagna: 643 (1787), nom. illegit. based on type of *A. hyacinthoides*. *S. thyrsiflora* (Petagna) *Thunb.*: 65 (1794); *Thunb.*: 329 (1823); *Bak.*: 547 (1875); *Bak.*: 5 (1896).

S. angustiflora *Lindb.*: 130, t. 5 (1875). *Iconotype*: *Lindb.* in *Acta Societatis scientiarum fennicae* 10: 130, t. 5 (1875): no specimen preserved.

S. grandis *Hook. f.*: t. 7877 (1903). *Iconotype*: t. 7877 in *Curtis's Botanical Magazine* (1903), drawn from specimen sent to Kew from Cuba, but probably not indigenous there, not preserved ?

S. grandis var. *zuluensis* *N.E. Br.*: 251 (1915). Type: Natal, Zululand, at Somkele, *Wylie in NH 12010* (NH, holo.).

* Pinelands Place, Lonsdale Road, 7405 Pinelands; formerly of the Botanical Research Institute, Pretoria. Manuscript updated by K.L. Immelman, Roodeplaat Grassland Institute, Private Bag X05, 0039 Lynn East.

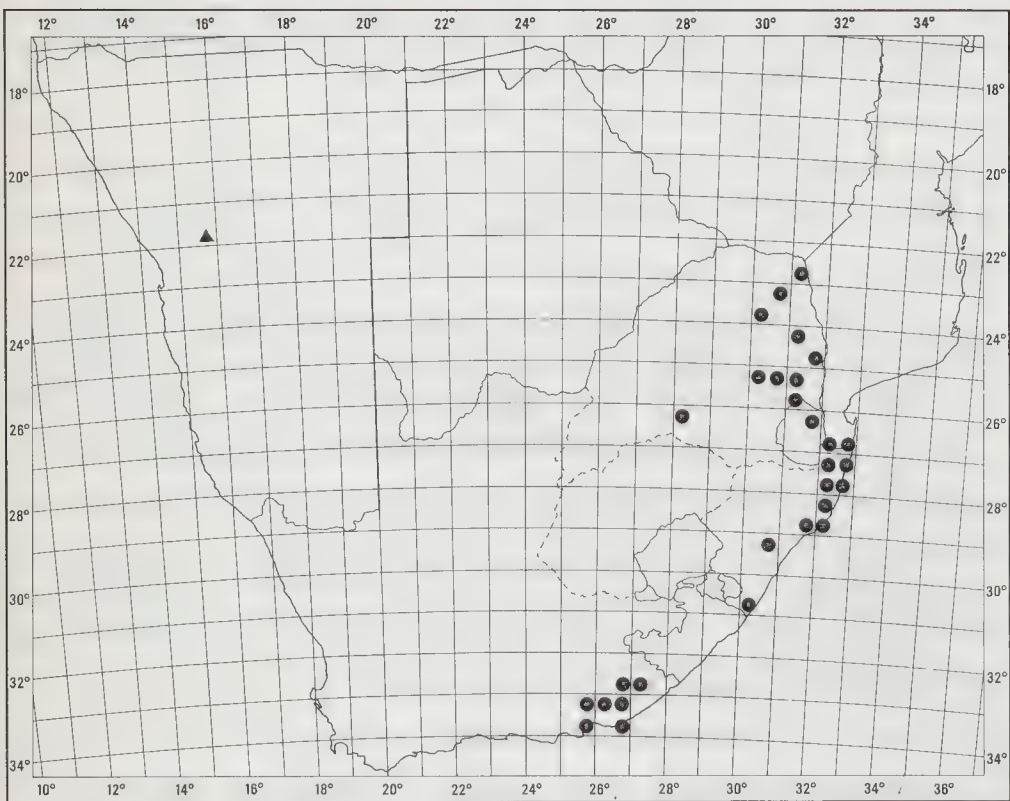


Acaulescent, rhizomatous perennials forming large colonies. *Rhizome* and roots typical. *Leaves* rosulate, $\pm 2-8$, lanceolate to broadly linear, up to $\pm 600 \times 40-80$ mm, flat to somewhat incurved, with irregular, paler horizontal areas, margin entire with a thin, red and pale, membranous edge. *Inflorescence* a simple raceme, erect, dense, many-flowered, up to 0,45 m high; peduncle short, firm. *Flowers* irregularly clustered on small, raised areas, subtended by small bracts, opening towards evening, delicately scented. *Perianth* $\pm 30-40$ mm long, lobes ± 20 mm long, cream or pale mauve. *Stamens* exerted; filaments thin; anthers versatile, yellow. *Fruit* shortly stipitate, globular, orange or yellow; seeds globose, ± 8 mm in diameter, epidermis thick. Figure 2.

Widespread in the eastern parts of southern Africa into tropical east Africa, along the coast and further inland; growing in dry karoo, bushveld or savanna, in well drained sandy or rocky soil. Map 3.

Hooker (1903) reported that Mr H.L. Hall of Nelspruit had informed him that the natives of this region used the fibres of the species (identified at the time as *S. grandis* Hook. f.) for ropes, etc. The fibre was apparently strongest when collected in summer, but not as good during the dry winter months.

Vouchers: Codd & Dyer 4654; Compton 28572; Medley Wood 12307; Van der Schijff 2336; Van der Schijff 3483.



MAP 3. — ● *Sansevieria hyacinthoides* ▲ *S. longiflora*

2. *Sansevieria longiflora* Sims in Curtis's Botanical Magazine: t. 2634 (1826); Schult. f.: 357 (1827); Kunth: 17 (1850); Bak.: 548 (1875); Bak.: 7 and 3, fig. 2 (May, 1887); Engl.: 144, t. 5, figs. G, H (1908). Iconotype: Plate 2634 in Curtis's Botanical Magazine (1826), taken from a cultivated plant from Lady Banks's garden at Spring Grove.

Rhizomatous perennials. *Leaves* basal, rosulate, $\pm 4-6$, spreading, flat but somewhat concave near base, linear-acuminate, $300-450 \times \pm 40$ mm, apex acuminate and apiculate, smooth, tough, irregularly blotched with darker and lighter transverse grey bands, margin entire, reddish or yellowish. *Inflorescence* an erect dense raceme, ovoid, dense, with the flowers overlapping, 0,3 m or more high; peduncle with scattered, membranous, apiculate, enveloping bracts. *Perianth* typical, ± 100 mm long, narrowly tubular, greenish cream; lobes linear, narrow, recurved, ± 25 mm long. *Stamens* and *gynoecium* typical. *Berry* not seen.

Occurs in Namibia; also widespread in tropical Africa; in sandy places. Map 3.

Voucher: Giess 11457A.

3. *Sansevieria aethiopica* Thunb., Prodrum plantarum capensium: 65 (1794); Thunb.: 329 (1823); Schult. f.: 358 (1827); Kunth: 19 (1850); N.E. Br.: t. 8487 (1913); N.E. Br.: 230 (1915); Verdoorn: t. 212 (1926); Adams: t. 28 (1976). Type: Cape Province, near Uitenhage, Thunberg (UPS; microfiche in PRE, no. 8576).

S. caespitosa Dinter: 228 (1926). Type: Namibia, Maltahöhe, Dinter 3148.

S. scabrifolia Dinter: 85 (1932). Type: Namibia, Otavifontein, Dinter 5377 (B, holo.?; PRE, iso.).

S. zeylanica auct. non Willd.: Ait. f.: 278 (1811); Redouté: t. 290 (1810); Kunth: 19 (1850); Bak.: 548 (1875); Bak.: 8 and 3, fig. 5, but not figure on p. 4 (May, 1887); Bak.: 5 (1896).

Rhizomatous perennials forming large colonies. *Rhizome* long, the new shoots placed

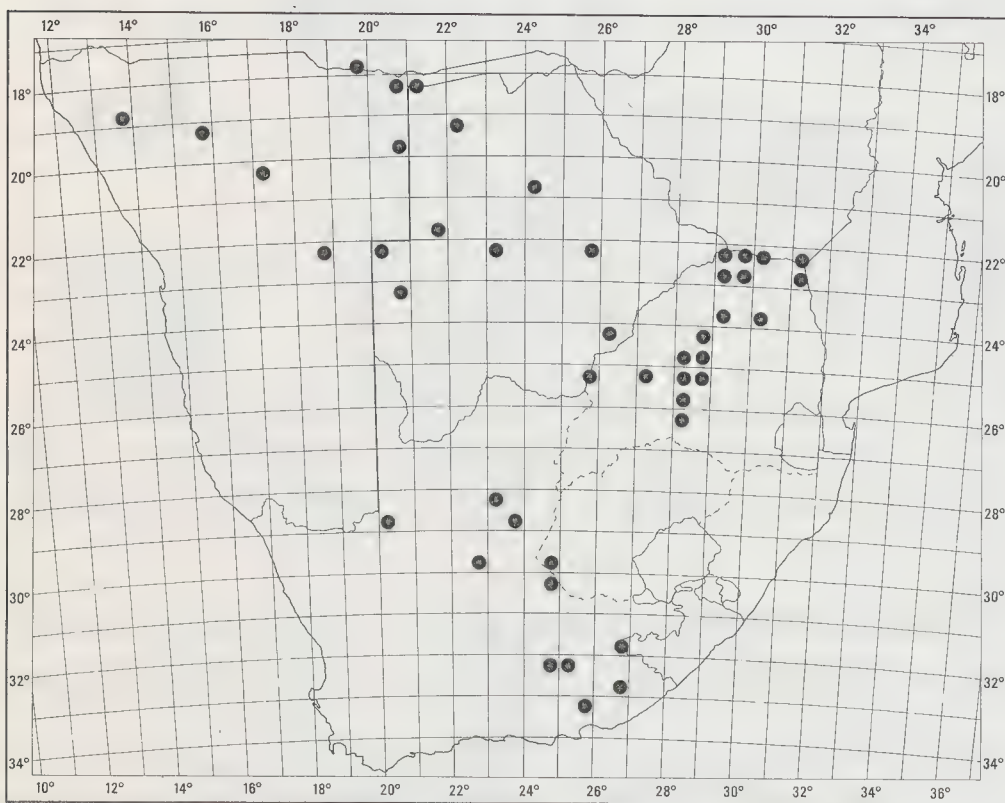
FIGURE 2. — *Sansevieria hyacinthoides*: 1a, habit, $\times 0,5$; 1b, flower, $\times 1$; 1c, cross section of leaf near base, $\times 0,5$ (after Codd 5369). *S. aethiopica*: 2a, habit, $\times 1$; 2b, flower, $\times 1$; 2c, cross section of leaf near base, $\times 0,5$ (after Perold 884). *S. pearsonii*: 3a, base of plant, $\times 1$; 3b, flower, $\times 1$; 3c, cross section of leaf near base, $\times 0,5$ (after Codd 4838). Artist: G. Condry.

fairly far apart, roots typical. *Leaves* rosulate, numerous, up to 15 or more, usually in fascicles of 3, erect to somewhat spreading, half folded, narrowly linear, up to $\pm 350 \times 10\text{--}20$ mm, hard and rough in texture (epidermis minutely papillate), mottled with light and dark irregular horizontal bands, margin red with a colourless membranous outer ridge. *Inflorescence* a simple, dense, many-flowered spike, exserted from leaf cluster, 0,35–0,75 m high; peduncle with some scattered, membranous bracts. *Flowers* in clusters, surrounded at the base by a membranous, ovate bract; pedicel ± 5 mm long. *Perianth* ± 50 mm long, variable in colour, white, purple or cream with purple margins; tube contracted below ovary for ± 4 mm, expanded and globose around ovary, narrowly cylindrical in upper half, ± 35 mm long; lobes, narrow, recurved, ± 13 mm long. *Stamens* much exserted, erect; filaments filiform; anthers versatile, ± 3 mm long, yellow. *Ovary* attenuate-ovoid, 3-knobbed at apex; style and globose stigma exserted. *Berry* globose, ± 10 mm in diameter, red. Figure 2.

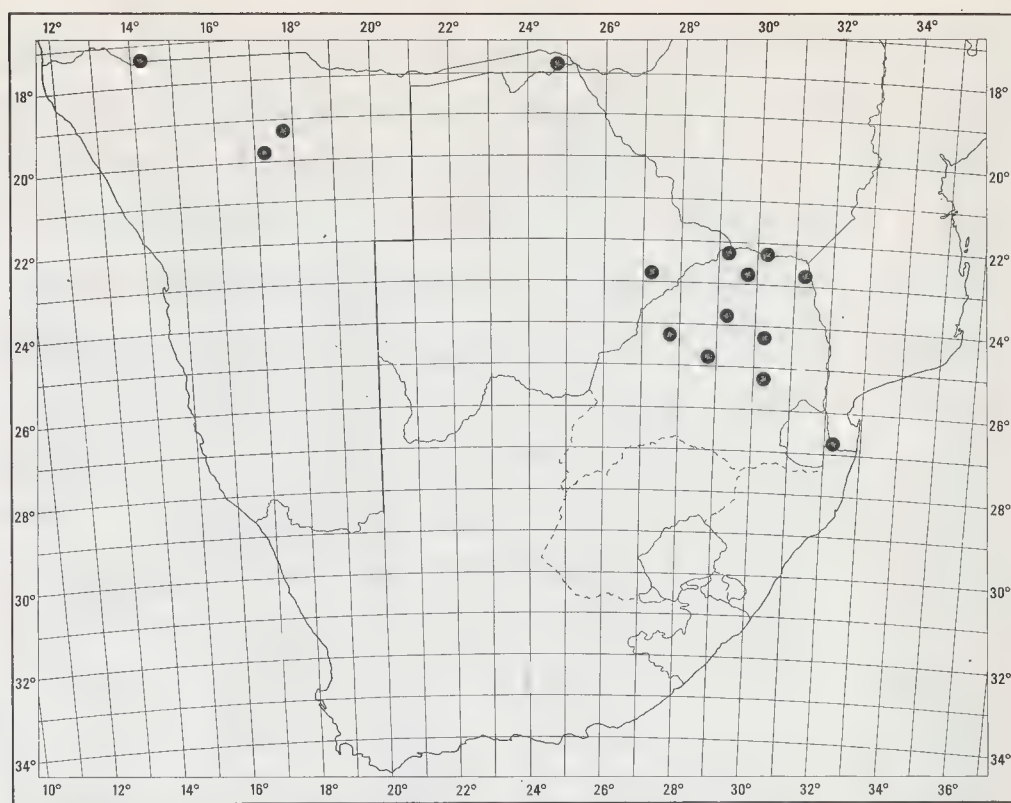
Widespread in drier parts of southern Africa, in Namibia, Botswana, Transvaal and O.F.S., and in northern and eastern Cape; also in Zimbabwe; growing in dry open places, bushveld or savanna, in well drained sandy or rocky soil. Map 4.

The genus was founded on this species by Thunberg (1794). It has been cultivated in Europe since about 1700.

The Tswanas use the rhizome to obtain moisture, and the leaf fibres to make string. The plant is also used in local religious practices.



MAP 4.—*Sansevieria aethiopica*



MAP 5.—*Sansevieria pearsonii*

Vouchers: *Barnard 99 B*; *Codd 3613*; *Codd 5825*; *De Winter & Leistner 5616*; *Leistner 2000*; *Miller 683*; *Pole Evans 4522*; *Thode A 618*; *Werger 184*.

4. *Sansevieria pearsonii* N.E. Br. in Kew Bulletin 1911: 97 (1911); N.E. Br.: 216, fig. 9 (1915); Sölch & Roessl.: 2 (1966). Type: southern Angola, near KM 108,5 on Mossamedes railway line, *Pearson 2073* (K, holo.).

S. desertii N.E. Br.: 208 (1915); Verdoorn: t. 806 (1941). Syntypes: Botswana, on banks of Botletle River, *Mrs Lugard 9* (K); Botswana, shores of Lake Ngami and the Botletle River, *Nicolls s.n.* (K).

Perennials forming large colonies. *Rhizome* and roots typical. *Leaves* distichous, erect, alternate, $\pm 5\text{--}7$, cylindrical, bases overlapping below, $\pm 0,5\text{--}1,0$ m long, hard, smooth becoming ribbed with age, grooved on inside, margins red with a white outer membrane; immature leaves of seedlings ± 10 , rosulate, linear-acuminate, gradually curving inwards at maturity, becoming distichous and cylindrical with an apical groove. *Inflorescence* a tall raceme, emerging from centre of leaves, up to ± 1 m high; peduncle with 5–7 narrow, pointed bracts. *Flowers* typical, numerous, in small, knobbly, bracteate clusters of $\pm 6\text{--}10$ flowers each, clusters placed irregularly along peduncle; pedicels articulated in the middle, anthesis presumably at night as in other species. *Perianth* 18–35 mm long; tube 12–25 mm long; lobes 6–10 mm long, colour variously

described as drab, greyish or 'bluish mauve at base, red-streaked higher up, tepals cream inside with pale pink or mauve' (fide *Pooley 1437*). Fruit typical, globose, orange. Figure 2.

Widespread in summer rainfall areas of southern Africa,

in Namibia, Transvaal and Natal; also in tropical Africa; in scrub and savanna or on river banks, in dry sandy or rocky soil. Often forming large dense colonies. Map 5.

Vouchers: *Bauling 3*; *Phillips PRE 35931*; *Pooley 1437*; *Rogers TM 18813*; *Strey 7793*; *Van Zyl PRE 35930*.

REFERENCES

- ADAMS, J. 1976. *Wild flowers of the northern Cape* t. 28. Department of Nature and Environment Conservation, Cape Town.
- AITON, W.T. 1811. *Hortus kewensis*, edn 2. Longman, Hurst, Rees, Orme & Brown, London.
- BAKER, J.G. 1875. Tribus II. Sansevieriae. *Journal of the Linnean Society of London, Botany* 14: 546–551.
- BAKER, J.G. 1887. Bowstring hemp. *Kew Bulletin* 1,5: 1–11.
- BAKER, J.G. 1896. *Sansevieria*. In W.T. Thiselton-Dyer, *Flora capensis* 6: 4–6. Reeve, London.
- BAKER, J.G. 1898. *Sansevieria*. In W.T. Thiselton-Dyer, *Flora of tropical Africa* 7: 332–336. Reeve, London.
- BENTHAM, G. & HOOKER, J.D. 1883. *Genera plantarum* 3. Reeve, London.
- BROWN, N.E. 1911. Diagnoses africanae XXXIX. *Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew* 1911: 82–97.
- BROWN, N.E. 1913. *Sansevieria aethiopica*. *Curtis's Botanical Magazine* 139: t. 8487.
- BROWN, N.E. 1915. *Sansevieria*: a monograph of all the known species. *Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew* 1915: 185–261.
- COMMELIN, C. 1703. *Praeludia botanica*. Fredericum Haringh, Lugduni Batavorum.
- DINTER, K. 1926. Index der aus Deutsch-Südwestafrika bis zum Jahre 1917 bekannt gewordenen Pflanzenarten XXI. *Repertorium novarum specierum regni vegetabilis* 23: 227–236.
- DINTER, K. 1932. Diagnosen neuer südwestafrikanischer Pflanzen. *Repertorium novarum specierum regni vegetabilis* 30: 80–96.
- DRUCE, G.C. 1914. Notes on nomenclature. In supplement to Botanical Exchange Club Report for 1913. *The Botanical Society and Exchange Club of the British Isles Report for 1913* 3,5: 413–426.
- DYER, R.A. 1976. *The genera of southern African flowering plants* 2. Department of Agricultural Technical Services, Pretoria.
- ENGLER, H.G.A. 1908. *Die Pflanzenwelt Afrikas insbesondere seiner tropischen Gebiete* C. Engelmann, Leipzig.
- HOOKER, J.D. 1903. *Sansevieria grandis*. *Curtis's Botanical Magazine* 129: t. 7877.
- JACQUIN, N.J. 1770. *Hortus botanicus vindobonensis* 1: 36. Kaliwoda, Vienna.
- KRAUSE, K. 1930. *Sansevieria*. *Die natürlichen Pflanzenfamilien*, edn 2, 15a: 360, fig. 146.
- KUNTH, C.S. 1850. *Enumeratio plantarum* 5. Cotta, Stuttgart & Tübingen.
- LINDBERG, S.O. 1875. Plantae nonnullae horti botanici helsingforsiensis. *Acta Societatis scientiarum fennicae* 10: 130, t. 5.
- LINNAEUS, C. 1753. *Species plantarum*, edn 1. Salvii, Stockholm.
- LINNAEUS, C. 1762. *Species plantarum*, edn 2. Salvii, Stockholm.
- MARAIS, W. 1973. Nomina conservanda proposita No. 350. *Taxon* 22: 158–159.
- PETAGNA, V. 1787. *Vincentii Petagnae in regio neapolitano lyceo botanices professoris Institutiones botanicae* 3: 643. Porcelli, Neapoli.
- REDOUTÉ, P.J. 1810. *Les Liliacées* V: t. 290. Paris.
- ROEMER, J.J. & SCHULTES, J.A. 1829. *Caroli a Linné equitis Systema vegetabilium* 7,1. Cotta, Stuttgart.
- ROEMER, J.J. & SCHULTES, J.A. 1830. *Caroli a Linné equitis Systema vegetabilium* 7,2. Cotta, Stuttgart.
- SCHULTES, J.A. 1827. *Mantissa in volumen (primum?)*. *Systematis vegetabilium Caroli a Linné* 3. Cotta, Stuttgart.
- SIMS, J. 1826. *Sansevieria longiflora*. *Curtis's Botanical Magazine* 53: t. 2634.
- SÖLCH, A. & ROESSLER, H. 1966. *Sansevieria*. In H. Merxmüller, *Prodromus einer Flora Südwestafrikas* 148: 1–2.
- THUNBERG, C.P. 1794. *Prodromus plantarum capensium* I. Edman, Uppsala.
- THUNBERG, C.P. 1823. *Flora capensis*, ed. Schultes. Edman, Uppsala.
- VERDOORN, I.C. 1926. *Sansevieria aethiopica*. *The Flowering Plants of South Africa* 6: t. 212.
- VERDOORN, I.C. 1941. *Sansevieria desertii*. *The Flowering Plants of South Africa* 21: t. 806.
- WIJNANDS, D.O. 1973. Typification and nomenclature of two species of *Sansevieria* (Agavaceae). *Taxon* 22, 1: 109–114.
- WIJNANDS, D.O. 1983. *The botany of the Commelins*. Balkema, Rotterdam.
- WILLDENOW, C.L. 1799. *Caroli a Linné species plantarum editio quarta* 2. Berlin.

ASPARAGACEAE

Suffrutices or scramblers with perennial or annual stems from a compact woody base. *Rhizome* sympodial, often covered by persistent erect cataphylls; roots many, fibrous or often tuberous. *Leaves* much reduced, bract-like, with a spinous or soft spur. *Cladodes* (phylloclades) solitary or fascicled, persistent or deciduous, terete or angled to flat, linear to ovate, apex mucronate, green, in some species forming a basal disc. *Spines* present except in *Myrsiphyllum* and some species of *Protasparagus*, cauline or foliar in origin. *Flowers* bisexual, hypogynous, inconspicuous, solitary, fascicled or racemose; peduncles or pedicels terete or grooved or reduced to a disc or 0, articulated once or twice; bracts minute or larger and concave. *Tepals* 3 + 3, similar, free and spreading or fused basally. *Stamens* 3 + 3, filaments free, arising from base of tepals; anthers bilocular, versatile, introrse, dorsifixed. *Ovary* 3-locular with 2–12 axile ovules per locule; style usually short; stigma capitate, 3-lobed or with 3 branches. *Fruit* usually a globose or ovoid berry, sometimes a nutlet, the tepals often persisting below; seeds 1 to several, globose, black.

Genera 3, species about 120; Africa, Asia, Europe; introduced in Australia.

Dahlgren *et al.* (1985) suggest that *Protasparagus* and *Myrsiphyllum* might best be treated as subgenera of *Asparagus*. However, in *Protasparagus* the flowers are bisexual (whereas in *Asparagus* the flowers are unisexual and the plants dioecious), there are 4–12 ovules per locule (in *Asparagus* only 2), and the seeds are globose (in *Asparagus* they are dorsally convex and ventrally angular).

Cladodes: various theories have been proposed about the origin of these usually needle-like organs in *Asparagus* and *Protasparagus* by Arber (1924) and others. McLean & Ivimey-Cook (1951) believed these short shoots to be pedicels and even mentioned that flowers had been observed at the apex. Cooney-Sovetts & Sattler (1986), however, after discussing in some detail the origin and nature of the cladodes (which they call phylloclades) of Asparagaceae, came to the conclusion that 'Phylloclades are a form of evolutionary novelty that exemplifies the phenomenon of homoeosis, which is the transference of features from one organ to another. Developmentally, this means that leaf features are expressed by the axillary meristem.'

Key to genera

- Tepals free, spreading from the base; stamens free, spreading; flowers often erect, fascicled or racemose, rarely solitary; spines usually present 1. **Protasparagus** (p. 11)
- Tepals cohering in lower half, forming a tube, spreading in upper half; stamen filaments cohering in a tube around gynoecium (except in *M. scandens* and *M. ramosissimum*); flowers pendulous and usually solitary (rarely 2 or 3); spines always absent 2. **Myrsiphyllum** (p. 71)

1113a

1. PROTASPARAGUS

by A.A. OBERMEYER* and K.L. IMMELMAN**

(Literature references on p. 68)

Protasparagus Oberm. in South African Journal of Botany 2: 243 (1983); Dahlg. *et al.*: 142 (1985); Mathew: 181 (1989). Lectotype species: *P. aethiopicus* (L.) Oberm.

Asparagus sect. *Asparagopsis* Kunth: 35 (1842). *Asparagopsis* (Kunth) Kunth: 76 (1850), non Montagne (1841) which is Algae-Rhodophyceae.

Asparagus L.: 313 (1753), pro parte; Thunb.: 65 (1794); Thunb.: 332 (1823); Bresler: i, 1 (1826); Roem. & Schult.: 317 (1829); Roem. & Schult.: 1673 (1830); Kunth: 76 (1850); Bak.: 594 (1875); Benth. & Hook. f.: 765 (1883); Bak.: 256 (1896); Bak.: 425 (1898); Marloth: 83 (1915); Krause: 362 (1930); Salter: 172 (1940); Hutch.: 608 (1959); Sölch *et al.*: 25 (1966); Jessop: 31 (1966); R.A. Dyer: 943 (1976).

Suffrutices or scramblers, often spiny, glabrous or shortly pubescent. *Rhizome* persistent, sympodial, bearing many, often tuberous roots. *Stems* perennial or annual, erect, spreading or twining.

* Pinelands Place, Lonsdale Road, 7405 Pinelands; formerly of the Botanical Research Institute, Pretoria.

** Roodeplaat Grassland Institute, Private Bag X05, 0039 Lynn East.

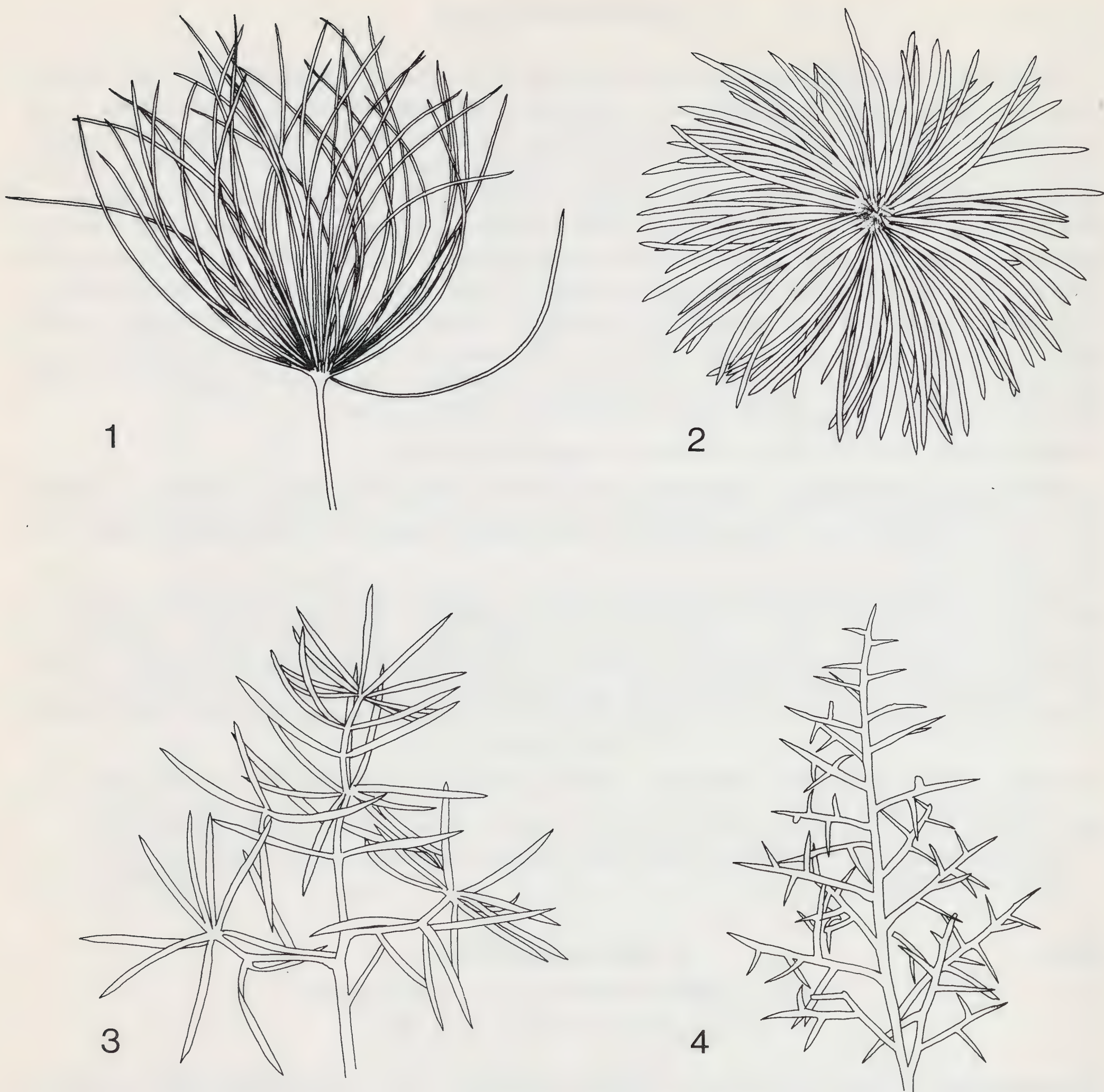


FIGURE 3.—Types of cladode fascicles, schematic: 1, erect from base (e.g. *Protasparagus laricinus*); 2, spherical (e.g. *P. setaceus*); 3, stellate (e.g. *P. rigidus*); 4, cladodes absent, branches and branchlets resembling cladodes (e.g. *P. oliveri*). Artist: R. Holcroft.

Leaves bract-like, upper part a simple scale leaf, basal part a spiny or soft spur (subgenus *Protasparagus*). *Branches* sometimes spiny (subgenus *Suaveolens*) or variously developed and bearing flowers. *Cladodes* borne in axil of scale leaf, single or few to numerous, usually fascicled (Figure 3), sometimes absent or deciduous, terete or flattened, sometimes with discoid base. *Flowers* inside or beside cladode fascicles or in compound or simple racemes, strongly and sweetly scented; stalk with discoid articulation below perianth. *Tepals* 3 + 3, free or occasionally fused at base, usually white or cream. *Stamens* 3 + 3, shorter than tepals; filaments usually broadened below. *Ovary* 3-locular; style usually short, with three short stigmas. *Fruit* a berry, usually 1(2 or 3)-seeded, rarely a nutlet. *Seed* globose, black.

Species 69 in southern Africa, possibly 30 to 40 in tropical Africa; also in Asia and introduced in Australia. Widespread and common, but not often collected, probably because of the short flowering period and the troublesome spines.

Watt & Breyer-Brandwijk (1962) reported on the uses made of species of *Protasparagus*. The young shoots are edible, as is well known. The roots, tubers and young shoots are also used medicinally and in witchcraft. In southern Africa species of the genus were once generally used in the treatment of pulmonary tuberculosis. In tropical African countries the root tubers are used to quench thirst and for various ailments, such as sore throats, stomach pains and as an anthelmintic.

Key to subgenera and series

(First page number indicates treatment of subgenus/series with key to species, second page number marks treatment of first species in series.)

- 1a Spines cauline in origin (stems and branches terminating in spines) 1. subgen. **Suaveolens** series **Suaveolens** (p. 13 + p. 19)
- 1b Spines, if present, foliar in origin (placed below cladodes and along stems), rarely absent (2. subgen. **Protasparagus**, p. 14):
 - 2a Stems and branches pseudo-sympodial 8. series **Sympodioidi** (p. 19 + p. 64)
 - 2b Stems and branches monopodial:
 - 3a Cladodes numerous, arranged in spherical fascicles (compressed in *P. plumosus*) or stellate; flowers solitary or few, either apical, inside or beside a fascicle 7. series **Globosi** (p. 18 + p. 58)
 - 3b Cladodes solitary to numerous, erect or spreading-erect, if many, then close together at the base so that the fascicle resembles a brush; flowers various:
 - 4a Spines absent; erect shrubs; flowers solitary, pendulous 1. series **Penduli** (p. 14 + p. 31)
 - 4b Spines present, at least on lower part of stem, occasionally absent; plant erect or scandent; flowers erect, several:
 - 5a Flowers racemose 5. series **Racemosi** (p. 16 + p. 43) and 6. series **Protasparagus** (p. 16 + p. 49)
 - 5b Flowers one to many, clustered on peduncles inside or next to a cladode fascicle:
 - 6a Stems and branches straight with the epidermis entire; flowers one to many; roots thick but terete and not swollen into fusiform tubers 2. series **Africani** (p. 15 + p. 33) and 3. series **Retrofracti** (p. 15 + p. 36)
 - 6b Stems and branches zigzagging with the epidermis exuviating into membranous strips; flowers usually two, divaricate; main roots swollen into fusiform tubers below rhizome (lower down on older plants) 4. series **Exuviali** (p. 16 + p. 42)

Subgenus **Suaveolens**

- 1. Subgen. **Suaveolens** *Oberm.*, subgen. nov.

Frutices. Spinis ex caule oriundis, id est caules ramique in spinis terminantes, saepe in spino simplice reducti; plerumque cum spinulis duobus minoribus lateralibus; subgenus praecipue e speciebus regionis pluviae hiemalis composita. Typus: Protasparagus suaveolens (Burch.) Oberm.

Shrubs. *Spines* cauline in origin, i.e. stems and branches terminating in spines, often ultimately reduced to a simple spine; usually flanked by two smaller lateral spines. Predominantly winter rainfall region species.

Series **Suaveolens**

- Series **Suaveolens** *Oberm.*, series nov.

Frutices. Spinis ex caule oriundis, id est caules ramique in spinis terminantes, saepe in spino simplice reducti; plerumque cum spinulis duobus minoribus lateralibus; subgenus praecipue a speciebus regionis pluviae hiemalis composita. Typus: Protasparagus suaveolens (Burch.) Oberm.

Asparagus sect. *Capenses* Bak.: 257 (1896); Jessop: 37 (1966).

Description as for subgenus. Species no. 1–12.

- 1a Cladodes absent 12. *P. oliveri*
- 1b Cladodes present:
 - 2a Fruit a nutlet; flowers fascicled on reduced branchlets:
 - 3a Spines recurved, flattened, up to 10 mm long, with short recurved lateral spinules towards the apex; Little Karoo 1. *P. recurvispinus*

- 3b Spines straight; Namibia, O.F.S. and Cape Province, but not in Little Karoo:
 4a Cladodes in large fascicles placed in axils of spiny branchlets, spreading on all branchlets; Namaqualand 2. *P. bayeri*
 4b Cladodes in small fascicles evenly spaced along innocuous, deciduous branchlets, usually secund on the spreading branchlets; southern Namibia, O.F.S. and north-western Cape 3. *P. glaucus*
- 2b Fruit a berry; flowers apical or lateral:
 5a Flowers lateral beside opposing cladode fascicles, which are placed halfway along a spinous branch; basal half of spine puberulous, apical half glabrous; branchlets absent; young stems yellow; Transvaal and Botswana 11. *P. flavicaulis*
 5b Flowers apical on the branchlets; occurring in Namibia and the Cape Province, except for *P. suaveolens* which is widespread and common:
 6a Flowers sessile:
 7a Cladodes pubescent to glabrous; shrubs with normal, widely spreading branching pattern (rarely of 'foxtail' form) 4. *P. capensis*
 7b Cladodes glabrous; shrublets of the 'foxtail' form with the branchlets reduced; spines green with an orange tip 5. *P. stipulaceus*
 6b Flowers 'pedunculate':
 8a Stem with the branches suppressed below, forming a dense rounded head above, densely pubescent and covered with appressed spines; southern Cape 6. *P. mariaae*
 8b Stems with normal branching below:
 9a Cladodes filiform:
 10a Spines straight, often producing spinules (viz. suppressed branchlets); stems usually minutely pubescent; a widespread chamaephyte in both winter and summer rainfall regions 7. *P. suaveolens*
 10b Spines reflexed; stems glabrous, smooth and shiny; stems perennial; restricted to south-western and south-eastern Cape 8. *P. burchellii*
 9b Cladodes narrowly obovoid:
 11a Cladodes pubescent; spines without nodes, long, straight and exserted; Worcester district 10. *P. exsertus*
 11b Cladodes glabrous; spines usually with nodes; south-eastern and south-western Cape:
 12a Stems strongly zigzagging; spines reflexed; south-western and south-eastern Cape 8. *P. burchellii*
 12b Stems not or only slightly zigzagging; spines at right angles to stem; Port Elizabeth district 9. *P. spinescens*

Subgenus *Protasparagus*

2. Subgen. *Protasparagus*. Literature and type as for genus.

Shrubs or climbers. *Spines* foliar in origin, representing the petiolar limb and the scale above the ligular sheath. *Flowers* axillary, solitary to racemose. Represented in Africa to Asia and Australia.

Series *Penduli*

1. Series *Penduli* Oberm., series nov.

Asparagus sect. *Declinati* Bak.: 257 (1896) p.p. quoad *A. virgatus*; Jessop: 37 (1966) p.p. quoad *A. virgatus*.

Suffrutices erecti vel scandentes, non spinosi. Cladodia filiformia. Flores penduli, solitarii vel rare binati, pedunculati. Typus: Protasparagus pendulus Oberm.

Erect or scrambling, nonspinous shrublets. *Cladodes* filiform. *Flowers* pendulous, solitary or rarely paired, pedunculate. Species no. 13–15.

- 1a Scrambling soft shrublets; cladodes 10–20 in a fascicle, up to 7 mm long, aristate, rough (when magnified); south-western Karoo 15. *P. mollis*
 1b Erect, stiff herbs or shrublets; cladodes usually 2–5 in a fascicle, (4–)5–15(–25) mm long, acute but soft, smooth:
 2a Flowers placed along the branches; stems erect with spreading branches, giving a fern-like appearance, glabrous and clearly quadrate; cladodes (1)2–4(–7) in a fascicle, 5–15(–25) mm long; widespread in South Africa 13. *P. virgatus*
 2b Flowers apical on short branchlets; stems minutely pubescent, either quadrate or terete with unclear ribbing; cladodes \pm 5 in a fascicle, 5–10 mm long; northern Namibia, Botswana, Zimbabwe and Zambia 14. *P. pendulus*

Series **Africani** and Series **Retrofracti**

2. Series **Africani** (*Bak.*) *Oberm.*, comb. et stat. nov. Type: *Protasparagus africanus* (Lam.) *Oberm.* (= *Asparagus africanus* Lam.).

- Asparagus* sect. *Africani* Bak.: 257 (1896) p.p. quoad *A. laricinus*, *A. africanus*; Jessop: 37 (1966) p.p. quoad *A. africanus*.
- Asparagus* sect. *Umbellati* Bak.: 257 (1896) p.p. quoad *A. burkei*.
- Asparagus* sect. *Thunbergiani* Bak.: 257 (1896) p.p. quoad *A. cooperi*.

Flowering cladode fascicles placed along branches and/or branchlets. Species no. 16–20.

3. Series **Retrofracti** *Oberm.*, series nov.

- Asparagus* sect. *Declinati* Bak.: 257 (1896) p.p. quoad *A. denudatus*.
- Asparagus* sect. *Umbellati* sensu Bak.: 257 (1896) p.p. quoad *A. multiflorus*.
- Asparagus* sect. *Thunbergiani* Bak.: 257 (1896) p.p. quoad *A. thunbergianus*.
- Asparagus* sect. *Africani* Bak.: 257 (1896) p.p. quoad *A. retrofractus*; Jessop: 37 (1966) p.p. quoad *A. denudatus*, *A. compactus*, *A. thunbergianus*, *A. mucronatus*, *A. retrofractus*.

Flores *in ramulis brevibus patentibus vel recurvatis, intra vel juxta fasciculos cladodiorum (cladodia in P. denudato et P. pearsonii hysternantha) positi*. Radices *teretes*. Typus: *Protasparagus retrofractus* (L.) *Oberm.* (= *Asparagus retrofractus* L.).

Flowers placed on short, spreading or recurved branchlets inside or beside cladode fascicles (cladodes hysternanthous in *P. denudatus* and *P. pearsonii*). Roots *terete*. Species no. 21–30.

- 1a Spines present below cladode fascicles:
 - 2a Cladodes with a basal disc set on raised discs on the bulbous torus; winter rainfall region 23. *P. lignosus*
 - 2b Cladodes tapering to a cuneate base; summer rainfall region:
 - 3a Erect shrub; young stems white; widespread in summer rainfall region 16. *P. laricinus*
 - 3b Shrub when young, becoming a scrambler; young stems greenish, yellowish or brownish, but not white; southern Cape to Zululand, usually along coast but occasionally further inland 19. *P. africanus*
- 1b Spines present on main branches but not below cladode fascicles:
 - 4a Stems clearly longitudinally striate when young:
 - 5a Cladodes 2–6(–10) mm long, or absent at anthesis:
 - 6a Branches recurving; cladodes entirely absent at anthesis; flowers in clusters at ends of short branches with some scattered along branches; south-eastern O.F.S., Lesotho, north-eastern Cape 21. *P. denudatus*
 - 6b Branches at right angles to stems; cladodes present at flowering time, may be shorter than at maturity; flowers along branches; widespread in summer rainfall area :
 - 7a Shrub or rounded erect herb; branchlets often becoming spiny 17. *P. bechuanicus*
 - 7b Twiner, branches usually soft and twining 18. *P. cooperi*
 - 5b Cladodes (5–)7–45 mm long:
 - 8a Stems zigzag and usually whitish to pale grey; plant hard and spiky looking with stout cladodes 26. *P. retrofractus*
 - 8b Stems flexuous, not zigzagging, colour various; plant a shrub or scrambler with supple branches and stout or delicate cladodes:
 - 9a Mature cladodes (5–)10–20 mm long; species common and widespread in summer rainfall region 18. *P. cooperi*
 - 9b Mature cladodes (25–)40–50 mm long; a rare species from northern Namibia and northern Botswana 20. *P. longicladus*
 - 4b Stems without clear longitudinal striations when young, may have faint striations or be wrinkled where stems twisted:
 - 10a Plants pubescent, at least on young branches:
 - 11a Transvaal, O.F.S. and Natal 30. *P. devenishii*
 - 11b Cape Province:
 - 12a Cladodes with a basal disc set on raised discs on the bulbous torus; occurring inland in Karoo to northern Cape 25. *P. mucronatus*
 - 12b Cladodes tapering to a narrow base; occurring along south-eastern Cape coast 27. *P. multiflorus*

10b Plants glabrous at all stages:

13a Shrubs, stems straight or shallowly zigzagging; occurring in summer or winter rainfall region:

14a Flowers appearing before the cladodes; cladodes 10–30 mm long when mature; Namibia and northern Cape 22. *P. pearsonii*

14b Flowers and cladodes appearing together; cladodes usually 3–10 mm long; western, south-western and eastern Cape 24. *P. rubicundus*

13b Scrambler or, if erect herb or shrub, then stems flexuous and species occurring in the summer rainfall region:

15a Stems shallowly zigzagging; a rare species restricted to south-eastern Transvaal 28. *P. fractiflexus*

15b Stems flexuous; species widespread in summer rainfall region:

16a Flowers always placed along branches and branchlets 18. *P. cooperi*

16b At least some flowers placed on ends of short spreading or recurved branchlets 29. *P. edulis*

Series **Exuviali**

4. Series **Exuviali** *Oberm.*, series nov.

Asparagus sect. *Exuviali* Jessop: 37 (1966) (non latine).

Asparagus sect. *Declinati* Bak.: 257 (1896) p.p. quoad *A. exuvialis*, *A. ecklonii*.

Caules cortice in laciniis albis membranaceis exuviante. Frutices lignosi. Flores 2(–4), divergentes, in axillis ramulorum. Typus: Protasparagus exuvialis (Burch.) Oberm. (= *Asparagus exuvialis* Burch.).

Woody shrubs. *Stems* with bark exuviating in membranous, white strips. *Flowers* 2(–4), divergent, in axils of branchlets. Species no. 31 and 32.

Spines well developed, present below nodes of branches, branchlets and cladode fascicle; Namaqualand 31. *P. graniticus*
 Spines poorly developed, small, present only below nodes of branches or absent; widespread 32. *P. exuvialis*

Series **Racemosi** and Series **Protasparagus**

5. Series **Racemosi** (Bak.) *Oberm.*, comb. et stat. nov. Type: *Protasparagus racemosus* (Willd.) Oberm. (= *Asparagus racemosus* Willd.).

Asparagus sect. *Racemosi* Bak.: 258 (1896).

Asparagus sect. *Falcati* Bak.: 258 (1896) p.p. quoad *A. falcatus*, *A. oxyacanthus*.

Asparagus sect. *Crispi* Jessop: 38 (1966).

Flowers in racemes. *Main roots* with a fusiform swelling (at least when young) close to rhizome or further away. *Flowers* in simple or compound racemes. Species no. 33–38.

6. Series **Protasparagus**. Type: as for genus.

Asparagus sect. *Falcati* Bak.: 258 (1896) p.p. quoad *A. myriocladus*, *A. sprengeri*, *A. sarmentosus*, *A. aethiopicus*.

Asparagus sect. *Racemosi* sensu Jessop: 38 (1966) p.p. quoad *A. densiflorus*, *A. krebsianus* p.p., *A. obermeyerae*, *A. aspergillus*, *A. aethiopicus*, *A. aethiopicus* var. *angusticladus*, *A. falcatus* var. *ternifolius* sensu Jessop: 70 (1966), *A. crassicladus*, *A. acocksii*.

Flowers in racemes, representing modified branchlets, placed in the axils of branches. *Tubers* present on side roots (root system unknown in *P. acocksii*, *P. aspergillus* and *P. filicladus*). Species no. 39–53.

1a Plant glabrous:

2a Plant erect or spreading; stems covered with short to very short branches:

3a Plant erect with short to very short branches ('fox-tail' form); eastern Cape 39. *P. densiflorus* (including cv. Meyersii)

3b Plants with spreading stems \pm 1 m long, covered with short branches, more or less equally long; Natal to eastern Cape; extensively cultivated 39. *P. densiflorus* cv. Sprengeri

2b Plant erect, decumbent or scrambling; branches of normal length:

4a Cladodes broadly linear, \pm 2–5 mm wide, with a distinct midrib, not triangular:

5a Cladodes longer than 50 mm, wider than 2,5 mm 33. *P. falcatus*

5b Cladodes up to 35 mm long, \pm 2 mm wide:

6a Spines entirely absent 39. *P. densiflorus*

6b Spines present, at least on main branches:

7a Small shrub up to 1,5 m high:

8a Cladodes usually less than 20 mm long; spines below cladode fascicles often membranous, not hard 39. *P. densiflorus*

8b Cladodes usually 20–30 mm long; hard spines below cladode fascicles 43. *P. transvaalensis*

7b Scramblers or prostrate:

9a Western to north-western Transvaal 48. *P. aggregatus*

9b Southern and eastern Transvaal to Natal and eastern Cape:

10a Large scrambler up to 3 m high; cladodes \pm 30–40 mm long; racemes 300–400 mm long 50. *P. angusticladus*

10b Small decumbent scrambler; cladodes \pm 5–15 mm long; racemes 20–50 mm long 39. *P. densiflorus*

4b Cladodes linear or filiform, up to 2,0(–2,5) mm wide, with or without a distinct midrib, or may be 3-angled:

11a Midrib usually present, cladodes often solitary 39. *P. densiflorus*

11b Midrib absent; cladodes usually in fascicles (but often solitary in *P. krebsiana* and *P. natalensis*):

12a Spines entirely absent below cladode fascicles, may be present elsewhere on plant:

13a Shrubs; branches pale grey-white, not ridged; cladodes 15–25 per fascicle; eastern Cape 40. *P. filicladus*

13b Scramblers; branches various colours, may or may not be ridged; cladodes up to 8 per fascicle; Namibia,

Transvaal, Natal and Cape Province:

14a Young branches smooth or with poorly defined ridges 47. *P. clareae*

14b Young branches clearly and regularly ridged:

15a Cladodes linear, 1,5–2,5 mm wide 49. *P. natalensis*

15b Cladodes filiform or linear but narrower than 1 mm:

16a Spines reflexed, flattened, 15–50 mm long at base of plant; racemes simple or compound; anthers yellow, berry bearing a short basal knob 34. *P. buechananii*

16b Spines spreading-recurved, 5–10 mm long at base of plant; racemes simple; anthers red, berry rounded at base:

17a Cladodes flat, filiform 35. *P. racemosus*

17b Cladodes triangular in cross-section, up to 1(–2) mm wide 46. *P. aethiopicus*

12b Spines present below cladode fascicles, at least on older branches:

18a Scandent, up to 2–5 m high 46. *P. aethiopicus*

18b Shrubs:

19a Stems whitish grey, smooth; Namibia, Botswana, northern Transvaal and north-western Cape ... 37. *P. nelsii*

19b Stems greenish, brownish or dark grey, clearly ribbed; Natal and eastern Cape:

20a Cladodes 8–12 per fascicle, \pm 0,5 mm in diameter; northern Natal 45. *P. coddii*

20b Cladodes 1–4 per fascicle; \pm 1–2 mm in diameter; eastern Cape 42. *P. krebsiana*

1b Plant densely pubescent to minutely puberulous or papillose, at least on ribs of branches and branchlets:

21a Stems ribbed, puberulous along ribs so that hairs run in lines, or papillose; cladodes triangular in cross-section and narrower than 1 mm:

22a Scrambler; flower stalks articulated above the middle; northern and eastern Transvaal 51. *P. aspergillus*

22b Shrubs or shrublets; articulation of flower stalk at or below middle; widespread:

23a Cladodes 1–3(–5) per fascicle, linear, not deciduous; stems slightly zigzagging; south-western Cape and Little Karoo 41. *P. confertus*

23b Cladodes up to 9 per fascicle, filiform, deciduous; stems straight; Namibia, Botswana, Transvaal and Natal:

24a Occurring in northern Natal 45. *P. coddii*

24b Occurring from northern Namibia to Transvaal:

25a Main root tuberous 37. *P. nelsii*

25b Side roots tuberous 44. *P. schroederi*

21b Stems smooth, pubescence distributed over whole surface; cladodes triangular, oval or flat in cross-section, may be up to 5 mm wide:

- 26a Shrub; cladodes flat with a definite midrib, 3–5 mm wide; flower stalks articulated at or above middle 38. *P. oxyacanthus*
- 26b Scandent; cladodes triangular or oval in cross-section, may be up to 2 mm wide in some species but then without a midrib; flower stalks articulated below middle:
- 27a Cladodes triangular in cross-section, with marginal ridges, narrower than 1 mm:
- 28a Main root tuberous, restricted to eastern Transvaal 36. *P. lynetteae*
- 28b Side roots tuberous; eastern Transvaal to northern Transvaal and south-eastern Cape 53. *P. acocksii*
- 27b Cladodes flat or oval in cross-section, without marginal ridges, usually 1–2 mm wide:
- 29a Cladode bases discoid, placed on a semiglobose torus, cladodes oval in cross-section and succulent; Natal and eastern Cape 52. *P. crassycladus*
- 29b Cladode bases not discoid, cladodes flat in cross-section; Transvaal 48. *P. aggregatus*

Series Globosi

7. Series **Globosi** Oberm., series nov.

Asparagus sect. *Declinati* Bak.: 257 (1896) p.p. quoad *A. setaceus*, *A. declinatus*, *A. macowanii*.

Asparagus sect. *Thunbergiani* Bak.: 257 (1896) p.p. quoad *A. microrhaphis*, *A. stellatus*, *A. minutiflorus*.

Asparagus sect. *Africani* sensu Jessop: 37 (1966) p.p. quoad *A. setaceus* p.p., *A. microrhaphis*, *A. macowanii*, *A. macowanii* var. *zuluensis*.

Asparagus sect. *Racemosi* sensu Jessop: 38 (1966) p.p. quoad *A. minutiflorus*, *A. rigidus*.

Cladodia in fasciculis globosis vel stellatis (optime visus in fasciculis apicalibus; fasciculi in *P. plumoso compressi*). Radices laterales cum vel sine tuberis (radices principales in *P. setaceo* et *P. concinno tumidae*). Spinae adsunt vel absentes. Typus: *Protasparagus setaceus* (Kunth) Oberm. [= *Asparagus setaceus* (Kunth) Jessop].

Cladodes in globose or stellate fascicles (best seen in apical fascicles; fascicles compressed in *P. plumosus*). Side roots with or without tubers (main roots swollen in young plants of *P. setaceus* and *P. concinnus*). Spines present or absent. Species no. 54–65.

1a Plants with normal spreading branches:

2a Flowers solitary or in fascicles; widespread in southern Africa:

3a Plants scandent; young stems not ribbed:

4a Plants minutely pubescent; flowers not seen; stems bearing swollen knobs; Namibia through Botswana and north-western Cape to Transvaal 56. *P. nodulosus*

4b Plants glabrous; flowers 1–3, placed inside apical cladode fascicles; stems smooth, southern and eastern Cape, through Natal to Transvaal:

5a Cladode fascicles globose, cladodes 4–7(–12) mm long; main roots swollen in young plants ... 54. *P. setaceus*

5b Cladode fascicles compressed (flattened), cladodes \pm 3(–5) mm long; main roots terete 55. *P. plumosus*

3b Erect shrubs; young stems ribbed (except in *P. macowanii*):

6a Cladodes shortly cylindrical or obovoid, broadened and flat at the base, placed on a disc on the receptacle; flowers solitary, pendulous:

7a Cladodes shortly cylindrical, terete, glabrous; widespread in summer rainfall area 57. *P. microrhaphis*

7b Cladodes obovoid, clustered, with bristly hairs; eastern Cape to Lesotho and Natal 58. *P. stellatus*

6b Cladodes filiform, attenuate at base; flowers few to many:

8a Stems and branches smooth, glabrous; flowers many, erect in each dense cladode fascicle; eastern Cape, Natal and eastern Transvaal 60. *P. macowanii*

8b Stems and branches closely, minutely ribbed, often pubescent; flowers few (3 or 4), on long recurved pedicels, exerted from base of cladode fascicles; southern Transvaal, O.F.S., Lesotho and eastern Karoo 59. *P. concinnus*

2b Flowers in a compound raceme, viz. a modified branch, with cladodes absent or present among flowers; eastern and north-eastern Transvaal:

9a Erect; cladodes with papillate ribs; north-eastern Transvaal (Penge) 61. *P. fouriei*

9b Scandent; cladodes glabrous; eastern Transvaal (Lulu Mnts) 62. *P. sekukuniensis*

1b Plants 'fox-tail'-shaped, branches and branchlets contracted, forming a 'cylinder' around stem; flowers inside 'cylinder':

10a Spines absent; plant glabrous; flowers geminate on a short peduncle; Zululand and Swaziland 63. *P. biflorus*

- 10b Spines present; plant pubescent or glabrous; Transvaal:
11a Plants pubescent with soft, filiform cladodes 64. *P. minutiflorus*
11b Plant glabrous; xerophytic; cladodes stiff, 3-angled, with a brown, spinous tip 65. *P. rigidus*

Series Sympodioidi

8. Series Sympodioidi Oberm., series nov.

Asparagus sect. *Umbellati* Bak.: 257 (1896) p.p. quoad *A. subulatus*.
Asparagus sect. *Striati* Bak.: 257 (1896) p.p. quoad *A. striatus*, *A. erectus*; Jessop: 38 (1966).

Caules erecti vel scandentes, sympodioides, fractiflexi quidem juventute. Cladodia solitaria, congesta vel in fasciculis apicalibus. Flores intra fasciculos apicales cladodiorum congesti. Radices radicibus lateralibus tubera rhizomati semota ferentibus. Vulgata. Typus: Protasparagus striatus (L.f.) Oberm. [=Asparagus striatus (L.f.) Thunb.].

Stems erect or scandent, sympodioid, zigzagging, at least when young. *Cladodes* solitary, clustered or in apical fascicles. *Flowers* clustered inside apical cladode fascicles. *Roots* with tubers borne on side roots, some distance away from rhizome. Widespread. Species no. 66–69.

- 1a Cladodes 1–3 at ends of branches, flat, clearly striate, 2–5 mm wide; plants erect with ascending branches, branches somewhat zigzagging; Namibia, O.F.S., Cape, rarely in Namaqualand 66. *P. striatus*
1b Cladodes 2–8 at ends of branches, terete, ± striate; plants erect or scrambling, branches spreading or erect; eastern Cape to Transvaal:
2a Uppermost nodes with (2)3–8 cladodes bearing the cluster of flowers in their midst; eastern Cape 67. *P. subulatus*
2b Uppermost nodes with 2 cladodes; eastern Cape to Transvaal:
3a Branchlets short, stout, zigzagging; cladodes ± 10 mm long; compact, dense, spiny shrubs; flower fascicles about as long as subtending cladodes 68. *P. intricatus*
3b Branchlets long, thin; cladodes filiform, 30–40 mm long; plant erect or scrambling; flower fascicles much shorter than subtending cladodes 69. *P. divaricatus*

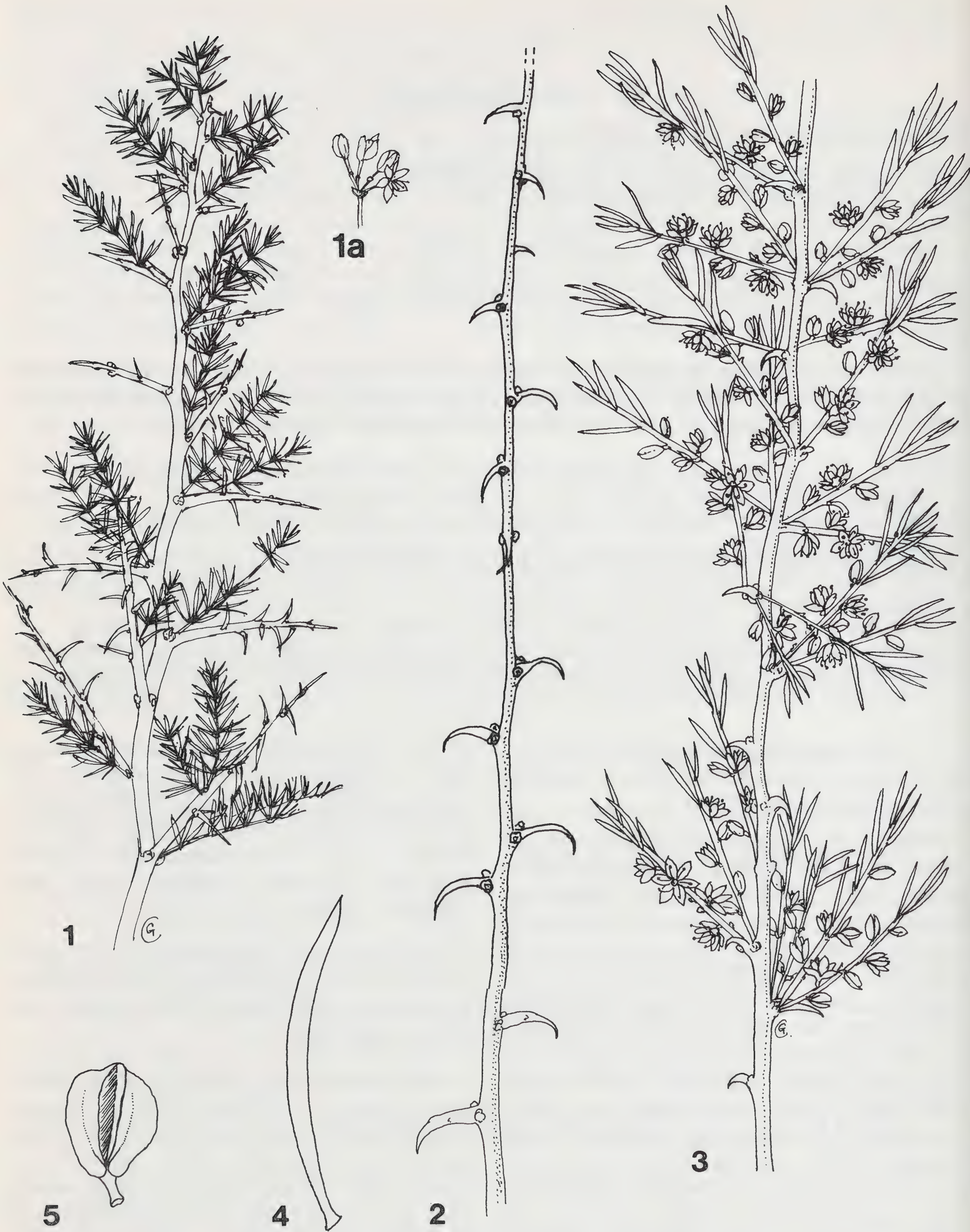
1. **Protasparagus recurvispinus** Oberm., sp. nov. *ab speciebus aliis subgeneris Protasparagus spinis recurvis differt.*

Frutices erecti grossi spinosi griseo-virides glabri, ± 1 m alti. Rhizoma compactum, radices crassas longas cylindraceas ferens. Caules duri furvi recti, ad 12 mm diametro, ramis multis adscendentibus lignosis, spinas acutas (ramuli deformati), ± 15–30 mm distantes ferentibus. Spinae uncatae, ± 5–10 mm longae, complanatae, basi torulosae ventricosae, interdum spinulis brevibus lateralibus. Nodi multigemmati, cladodia et flores ferentes. Cladodia 1–3 per fasciculum, teretia, ramulis forma similia, sed minora (uninodia), 5–10 mm longa, apiculata. Ramuli fertiles floribus binatis remote dispositis, fasciculis cladodium alternantibus. Pedicellus brevis, apice discoideo. Tepala oblonga, basi supraque acuta, ± 0,4 mm longa, exteriora angustiora, supra dentata, omnia erigescentia, stamina gynoeceumque includentia alba. Stamina

brevia, filamentis latis complanatis, antheris flavis. Ovarium oblongo-globosum; stylis 3 laxe connatis, supra ad exteriorem curvatis, apice stigmaticis, obtusis; 6–10 ovulis per loculum. Fructus nucula semen unum laevem nigrum globosum continens, perianthio sicco duro persistenti inclusa.

Type: Cape, 3321 (Ladismith): (–CC), north of Garcia’s Pass on karroid flats, *Mauve, Bohnen & Van Wyk 1* (PRE, holo.; STE); *Bohnen 8411* (PRE), with fruits.

Erect, coarse, hard, spinous, greyish green, woody shrubs ± 1 m high, glabrous. *Rhizome* compact, bearing thick, long, cylindrical, woody roots. *Stems* hard, dark, straight, up to 12 mm in diameter, bearing many ascending, woody branches, on which the sharp spines (deformed branchlets) are placed, ± 15–30 mm apart. *Spines* hooked, ± 5–10 mm long, flattened, knobbed and swollen at the base, occasionally

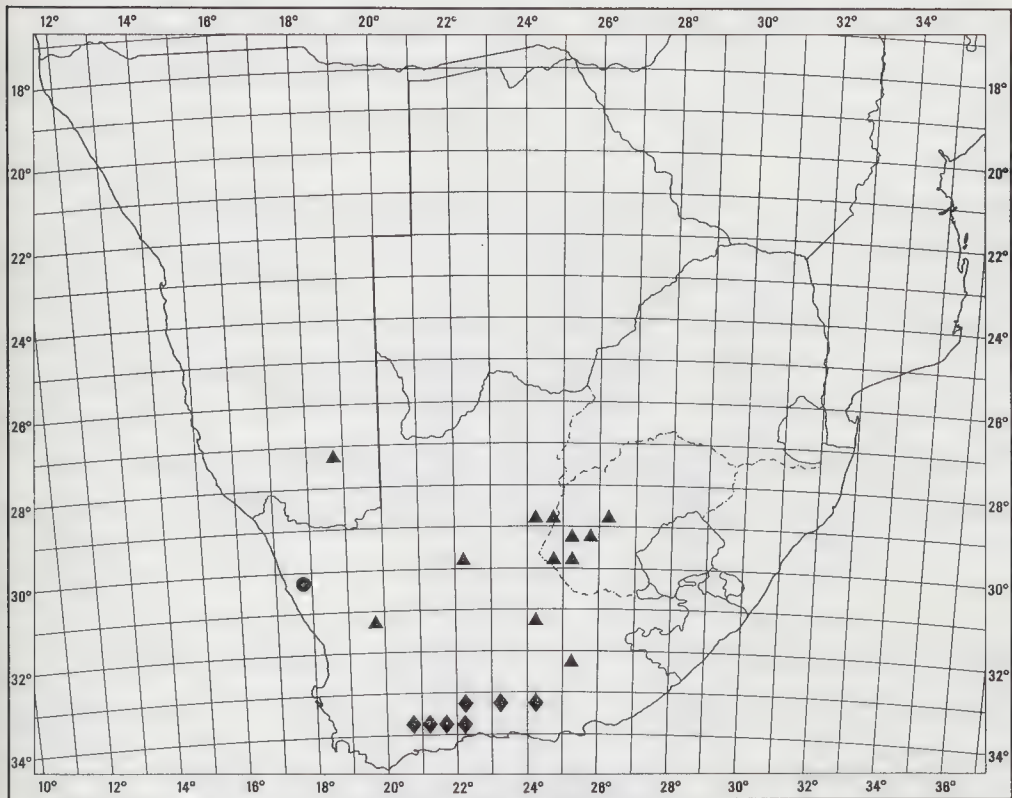


with short lateral spinules. *Nodes* many-budded, flanking spine, giving rise to short nonspinous, deciduous branchlets, bearing cladodes and flowers. *Cladodes* 1–3 in a fascicle, terete, similar to branchlet in shape but smaller (viz. one node), 5–10 mm long, apiculate. *Fertile branchlets* bearing paired flowers widely spaced, alternating with cladode fascicles. *Tepals* oblong, acute below and above, ± 0.4 mm long, the outer narrower, dentate above, becoming erect, enclosing the stamens and gynoecium, white; stalk short, apex discoid. *Stamens* short with broad, flat filaments, anthers yellow. *Ovary* oblong-globose; the 3 styles loosely fused, curved outwards above, apex stigmatic, obtuse; 6–10 ovules in each locule. *Fruit* a nutlet, containing one smooth, black, globose seed enclosed by the dry, hard, persistent perianth. Figure 4.

Recorded from the Little Karoo, between Langeberg and Swartberge, from Ladismith to Oudtshoorn; in sandy or shaley soil in Karoo, Succulent Karoo and Karroid Broken Veld. Flowering in November, with fruits in January. Map 6.

Related to *P. glaucus* (no. 3), but a coarser plant, with short, recurved spines (hence the specific epithet) and with flowers more laxly arranged.

Vouchers: *Bayer 3463*; *Bayer 3564A*; *Bayer 3564B*; *Britten 1623*; *Mauve 5432*; *Mauve & Hugo 213*; *Mauve & Hugo 215*.



MAP 6. — ◆ *Protasparagus recurvispinus*
● *P. bayeri*
▲ *P. glaucus*

2. *Protasparagus bayeri* Oberm., sp. nov.
a *P. glaucus* (Kies) Oberm. *cladodiis multis in quoque fasciculo differt.*

Frutices erecti ad 1 m alti, spinosissimi, caeruleo-grisei. Rhizoma et radices verosimiliter typicae. Caules recti laeves cinerei. Rami adscendentes ± 1.8 m longi dense instructi ramulis patentibus spinescentibus ± 20 –40 mm longis, spinulas patentes fasciculosque cladodiorum ferentibus. Cladodia persistentia, plerumque fasciculis binatis ad nodos, ± 4 –10 pro fasciculo, filiformia, ± 6 mm longa subcurvata caeruleo-grisea. Fasciculi florum binati juxta fasciculos cladodiorum, subsessili in ramulo contracto squamato. Flores 2–4 (non vidi); pedicelli ± 1 mm longi, apice discoideo. Fructus fortasse nux.

Type: Cape, 3017 (Hondeklipbaai): (–BB), Darter's Grave, south of Kamieskroon, sandy area among rocks, *Bayer 3289b* (PRE, holo.).

Small, erect shrubs ± 1 m high, bluish grey, very spiny. *Rhizome* and roots probably typical as for subgenus. *Stems* erect, smooth, dark grey. *Branches* ascending, ± 1.8 m long, closely beset with spreading, spiny branchlets ± 20 –40 mm long, bearing numerous spreading spinules and cladode fascicles. *Cladodes* persisting, usually in paired fascicles at the nodes, ± 4 –10 per fascicle, filiform, ± 6 mm long, somewhat curved, bluish grey. *Flower clusters* paired, beside cladode fascicles, subsessile, placed on a contracted scaly branchlet. *Flowers* 2–4 (not seen); stalks ± 1 mm long, apex discoid. *Fruit* most likely a nutlet.

A species recorded from Namaqualand, from around Darter's Grave, south of Kamieskroon; in karroid vegetation, 'sandy area among rocks'. Map 6.

This species is named after Mr M.B. Bayer, former curator of the Karoo National Botanical Garden, Worcester. His many collections from all over the Cape and his outstanding photographs have enriched in no small measure our knowledge of this interesting genus.

Voucher: *Mauve & Forrester 5380*.

FIGURE 4. — *Protasparagus glaucus*: 1, branch, $\times 1$; 1a, flowering branchlet, $\times 1$ (after Mogg 13621). *P. recurvispinus*: 2, bare branch with recurved spines, $\times 1$; 3, branch with innocuous flowering branchlets, $\times 1$; 4, cladode, $\times 4$; 5, nutlet, $\times 4$ (after Mauve, Bohnen & Van Wyk 1). Artist: G. Condry.



3. **Protasparagus glaucus** (Kies) Oberm. in South African Journal of Botany 2: 244 (1983). Type: O.F.S., Fauresmith, Groenvlei, Kies 340 (PRE, holo.).

Asparagus glaucus Kies: 229, fig. 5 (1951a); Sölch *et al.*: 30 (1966).

Erect shrubs up to 0.5 m high, glabrous. *Rhizome* with thick, terete roots. *Stems* erect. *Branches* ascending, bearing secondary branches transformed into compound spines, up to ± 70 mm long, with numerous lateral spinules up to 10 mm long (occasionally reduced); branchlets short, unarmed, placed in the axils of the compound spines and bearing the cladodes. *Cladodes* filiform, 3–10 mm long, apiculate, glaucous, overlapping, giving the branchlets a cylindrical soft appearance; absent at anthesis. *Flowers* numerous, axillary, placed close together, single or paired along short deciduous branchlets; tepals ± 4 mm, greenish; stalks articulated near the middle. *Ovary* with ± 8 ovules in each locule; shortly stipitate. *Fruit* a nutlet, the one seed enclosed in the globose, shiny perianth, ± 5 mm in diameter. Figure 4.

Recorded mainly from O.F.S., southern Namaqualand and eastern and north-western Cape, also from southern Namibia; usually on brackish soils. Map 6.

Vouchers: *Acocks* 8464; *Acocks & Hafström* H874; *Henrici* 4535; *Muller* 1617; *Ortendahl* 425.

4. **Protasparagus capensis** (L.) Oberm. in South African Journal of Botany 2: 243 (1983). Type: Cape of Good Hope, without precise locality, Plukenet, Phytographia t. 78, f. 3.

See Jessop: 43 (1966) for the selection of the type of *P. capensis* and further general information on this old, variable species.

Small, dense, hard, spiny shrubs up to 1 m high, very variable. *Rhizome* compact, with many terete, hard roots ± 6 mm in diameter. *Stems* several, erect, somewhat zigzagging, spine-tipped, with the branches spreading or contracted ('fox-tail' form). *Spines* cauline in origin, usually 3-nate, with the central longest, straight or

recurved, ± 30 mm long; the laterals short or also developing into branches or repressed. *Branchlets* bearing cladodes in the second year, aspinous, in short fascicles on both sides of the multibudded axils. *Cladodes* usually 5 in overlapping compact fascicles, narrowly obovoid, 2–5 mm long or, in var. *litoralis*, globose, ± 1 mm, or reduced to some small appressed bracts, pubescent or rarely glabrous, surrounded by a membranous, ciliate bract at base. *Flowers* apical, sessile, placed on a disc, solitary or binate, enveloped by an open, 3-lobed, ciliate, membranous bract; tepals puberulous dorsally, 3–5 mm long, with a green or purple centre streak. *Stamens* with flattened filaments; anthers yellow. *Ovary* with 4(–6) ovules in upper part, obovoid; style short with 3 short stigmas. *Berry* usually 1-seeded, ± 4 mm in diameter, red, perianth persistent at the base. Figure 5.

Recorded from southern Namibia to the Cape Peninsula and eastwards as far as Port Elizabeth, inland as far as Griquatown in north-western Cape. In rocky niches near the sea, in dune vegetation and karroid areas.

Two varieties are recognized:

Cladodes ± 5 in compact, erect fascicles or scattered along branches, narrowly obovoid to linear, with acute to mucronulate apices, ± 2 –4 mm long; widespread in winter rainfall region

..... 4a. var. *capensis*

Cladodes ± 20 in rounded, compact fascicles, globose to narrowly obovoid, ± 1 mm in diameter, apex obtuse to slightly indented; littoral, occurring along south-western Cape coast as far as Lüderitz

..... 4b. var. *litoralis*

4a. var. *capensis*.

Asparagus capensis L.: 314 (1753); Thunb.: 66 (1794); Jacq.: t. 266 (1798); Bresler: 21 (1826); Bak.: 617 (1875); Bak.: 263 (1896); Salter: 173 (1940); Jessop: 43 (1966); Sölch *et al.*: 30 (1966). *A. triacanthus* Burm. f.: 10 (1768), nom. illegit. (Art. 63.1). *Asparagopsis triacanthus* (Burm. f.) Kunth: 92 (1850). *Asparagopsis passerinoides* Kunth: 90 (1850), nom. illegit. Types: as for *P. capensis*.

Asparagus nelsonii Bak.: 617 (1875); Bak.: 264 (1896). Type: South Africa, *Nelson s.n.* (BM, holo.; PRE, photo.).

The typical variety has narrowly obovoid cladodes which are longer than in var. *litoralis*. See also key above.

FIGURE 5.—**Protasparagus capensis**: 1a, mature stem bearing cladodes and berries, 1b, young stem without cladodes in first year, $\times 0.33$; 2, apical flower with next to it the empty bracts of the second flower, $\times 4$; 3, berry, $\times 4$ (after Bayer 3279). Artist: R. Holcroft.

Widespread and common all over the winter rainfall region to north-eastern Cape. Map 7.

Vouchers: *Acocks* 21415; *Bayer* 3279; *Boucher* 4009; *Jessop* 695; *Marloth* 7255; *Mauve & Hugo* 89; *Rösch & Le Roux* 453; *Schlechter* 7886; *Snijman* 581; *Van Breda* 4495.

4b. var. *litoralis* *Suess*. in *Mitteilungen der Botanischen Staatssammlung München* 2: 50 (1950); *Jessop*: 44 (1966). Types: Namibia, Pomona, *Dinter* 3637 (B, holo.!, BOL, PRE!, SAM, Z); Cape Province, Elands Bay, *Strey* 427 (M).

The cladodes are reduced, globose and granular in appearance. See also key on p. 23.

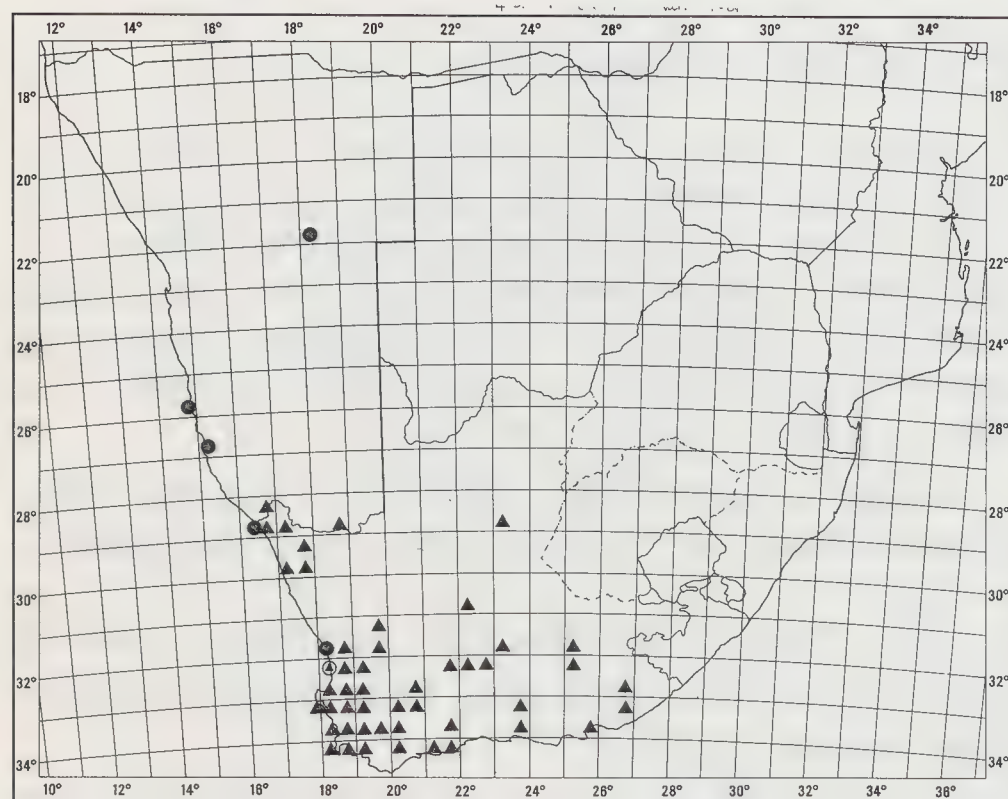
This variety is restricted to the coastal region from Lambert's Bay to Lüderitz in Namibia. Map 7.

Vouchers: *Boucher* 2600; *Galpin & Pearson* 7542; *Giess & Robinson* 13219; *Giess & Van Vuuren* 647; *Müller & Jankowitz* 273; *Taylor* 3951.

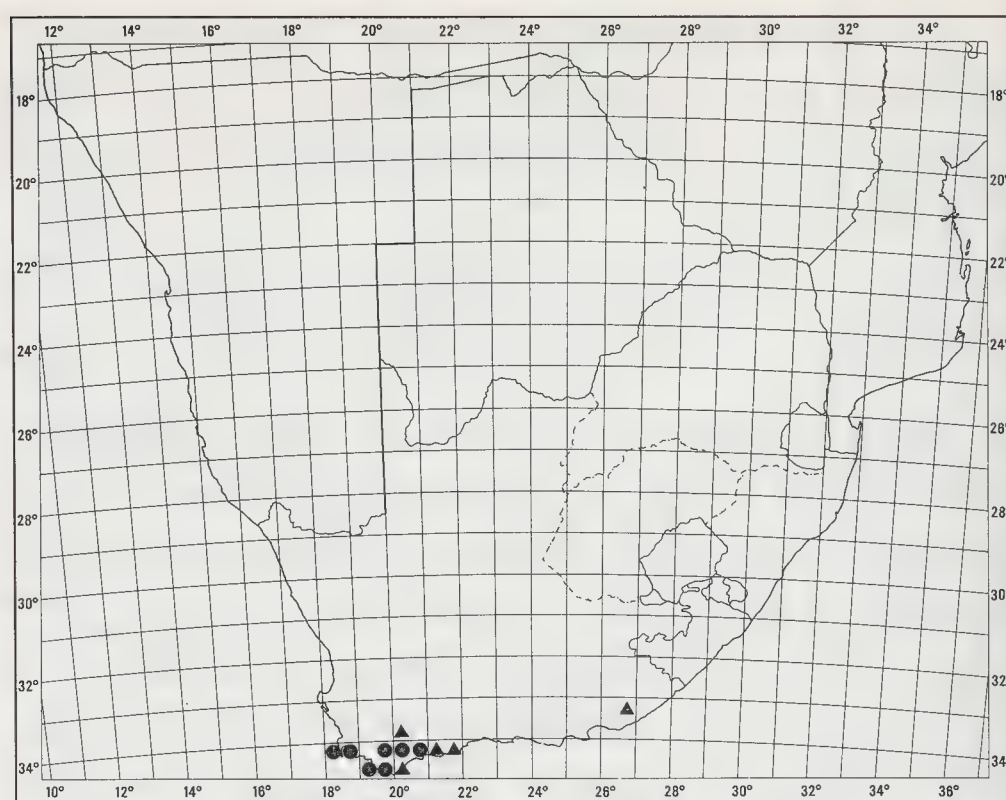
5. *Protasparagus stipulaceus* (Lam.) *Oberm.* in *South African Journal of Botany* 2: 244 (1983). Type: Cape Province, *Sonnerat* s.n. (P, holo.; PRE, photo.!).

Asparagus stipulaceus Lam.: 297 (1783); *Bresler*: 5 (1826); *Roem. & Schult.*: 333 (1829); *Salter*: 173 (1940); *Jessop*: 44 (1966). *Asparagopsis stipulacea* (Lam.) *Kunth*: 91 (1850).

Asparagus densus Soland. ex Bak.: 616 (1875); Bak.: 263 (1896). Type: Cape Province, without precise locality, *Auge* s.n. (BM, holo.; PRE, photo.!).



MAP 7. — ▲ and ● *Protasparagus capensis* var. *capensis*
● and ▲ *P. capensis* var. *litoralis*



MAP 8. — ● *Protasparagus stipulaceus*
▲ *P. mariae*

Plants erect, with the stems 'fox-tail'-shaped, viz. closely surrounded by very short, spreading, much reduced branches, $\pm 0,5$ m high; growing in clumps, very spiny. *Rhizome* typical; roots cylindrical, ± 5 mm in diameter. *Stems* erect, closely, minutely ribbed and pubescent. *Spines* ternate, the central occasionally with spinules, the 2 lateral basal spines shorter, divaricate, apex orange or brown. *Cladodes* on very short innocuous branchlets, usually 3-nate, terete, ± 10 mm long, apiculate, greyish green. *Flowers* apical, 1 or 2, on a minute apical disc, surrounded below by brown, membranous, fimbriate bracts; tepals ± 5 mm long. *Berry* globose, fleshy, red.

Confined to southern Cape coast, from the Cape Peninsula as far east as the Bredasdorp area; usually on the dunes near the sea, often amongst *Restionaceae*. Map 8.

According to *Jessop* (1966), the species flowers rarely except after fires. *Taylor* (pers. comm.) observed it to regenerate and flower after ground was cleared. Flowers recorded from April to July.

Vouchers: *Jessop* 699; *Mauve & Hugo* 158; *Oliver* 3428; *Olivier* 1558; *Schlechter* 10536; *Taylor* 10000.

6. *Protasparagus mariae* *Oberm.*, sp. nov. *P. capensis* (L.) *Oberm.* affinis sed caulibus basin versus sine ramis et floribus pedicellatis differt.

Frutices erecti robusti cinerascens ± 1 m alti, caule grosso puberulo infra spinis erectis

obtecto, supra in capitulum globosum ramificanti. Rhizoma typicum cataphyllis grossis acuminatis circum basin caulis; radices cylindricae. Caulis erectus dense puberulus, pilis brevibus erectis, spinis acutis et fasciculis cladodiorum (id est ramis redactis), albus vel pallidus. Rami supra bene evoluti, adscendentes, ramis lateralibus spinescentibus multis. Spinae prominentes durae ramosae spinibus 2 lateralibus basalibus divergentibus. Ramuli fasciculati ± 10 mm longi, fasciculos cladodiorum ferentes. Cladodia filiformia apiculata ± 4 mm longa 1–4 in quoque fasciculo. Flores 1–3 apicales e fasciculo cladodiorum exserti; tepala obovata ± 6 mm longa; pedicello ± 6 mm longo disco aegre e fasciculo bractearum parvarum chartacearum, exserto. Stamina typica. Ovarium ovulis 6 troque loculo. Fructum non vidi, verisimiliter bacca.

Type: Cape, 3420 (Bredasdorp): (–CA), ‘Uyshoek’, 7 km due north of Arniston, low, limestone hills, Thompson 3424 (PRE, holo.).

Erect, robust, greyish shrubs, ± 1 m high, the coarse puberulous stem covered by erect spines below, branching out into a rounded head above. *Rhizome* typical with coarse acuminate cataphylls around the stem base; roots cylindrical. *Stem* erect, densely puberulous with erect short hairs, sharp spines and cladode clusters (viz. branches suppressed below) white or pale. *Branches* well developed above, ascending, with numerous spiny side branches. *Spines* prominent, hard, branched with 2 basal, diverging side spines. *Branchlets* in clusters, ± 10 mm long, bearing small cladode fascicles. *Cladodes* filiform, apiculate, ± 4 mm long, 1–4 per fascicle, glabrous. *Flowers* 1–3, apical, exserted from a cladode cluster; tepals obovate, ± 6 mm long; stalk ± 6 mm long, the disc just exserted from a cluster of small papery bracts. *Stamens* typical. *Ovary* with 6 ovules in each locule. *Fruit* not seen, probably a berry.

Recorded from southern Cape, from Bredasdorp and Riversdale with one disjunct record from Grahamstown; in dry karroid vegetation, fynbos and semisucculent veld. Map 8.

The species was named after Mary Thompson-Rand, a dedicated botanist whose untimely death was a great loss to botany.

Vouchers: Bayer 3556; Jessop 642; Mauve & Hugo 135; Mauve & Hugo 171; Mauve & Hugo 202; Mauve & Hugo 210.

7. **Protasparagus suaveolens** (Burch.) Oberm. in South African Journal of Botany 2: 244 (1983). Type: Cape Province, Griquatown, Burchell 1956 (K, holo.!; PRE, photo!).

Asparagus suaveolens Burch.: 226 (1824); Pole Evans: t. 409 (1931); Jessop: 45 (1966).

Asparagus triacanthus Willd. ex Roem. & Schult.: 334 (1829). *Asparagopsis triacanthus* (Roem. & Schult.) Kunth: 91 (1850). Holotype: Cape, Lichtenstein in Herb. Willd. no. 6693 (B-WILLD).

Asparagus spinosissimus Kuntze: 315 (1898). Type: Cape Province, Cathcart, Kuntze s.n. (NY, holo.; BOL, photo!).

Asparagus omahekensis Krause: 447 (1914). Type: Namibia, ‘Zwischen Gobabis und Oas’, Dinter 2711 (B, holo.; PRE, photo.!; SAM!).

Asparagus intangibilis Dinter: 269 (1931). Type: Namibia, ‘Grosse Karasberge’, Dinter 5168 (B, holo.; PRE, photo!).

Asparagopsis zeyheri Kunth: 92 (1850). Type: without locality, Zeyher s.n.

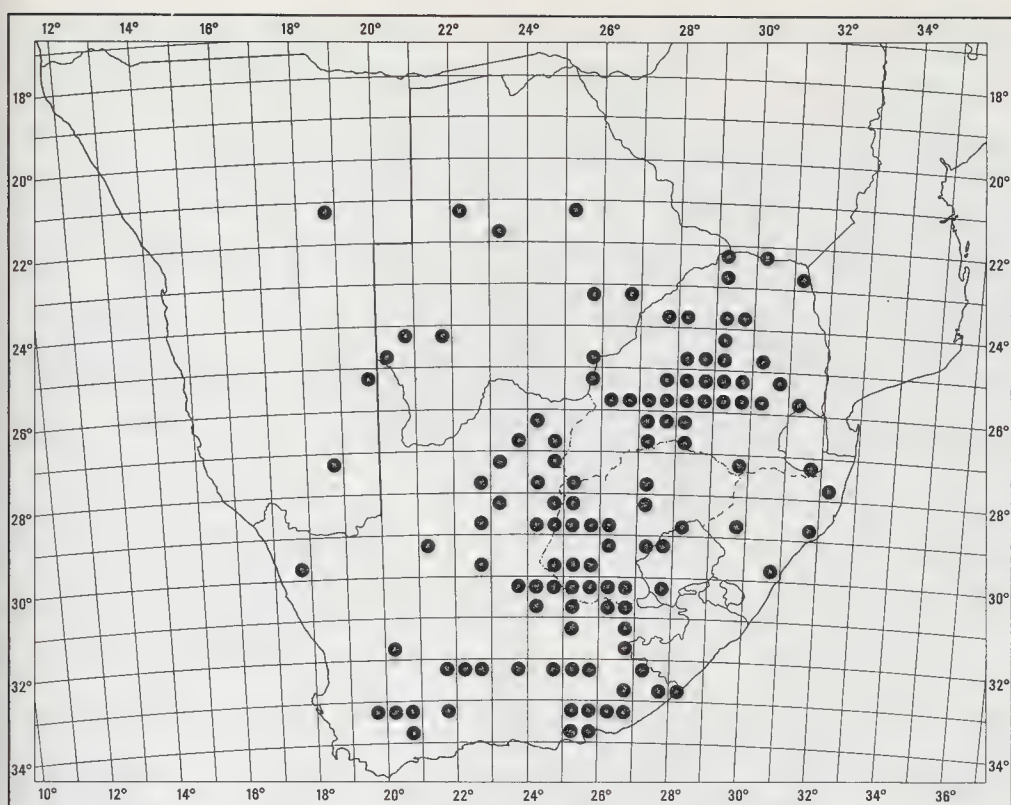
Erect chamaephyte, up to ± 1 m high. *Rhizome* typical with terete roots ± 3 –7 mm in diameter. *Stems* erect, annual, straight or slightly zigzagging, with short internodes, glabrous; nodes usually many-budded, proliferating into numerous spines, branches and branchlets. *Branches* similar to stem, straight or reduced to a noded, ternate, patent spine with 1 or 2 lateral spinules (‘fox-tail’ form). *Branchlets* nonspinous, short, few to numerous, bearing cladode fascicles and apical flowers. *Cladodes* 1–6 in a fascicle, subulate, 1–19 mm long. *Flowers* apical, 1–3; tepals narrowly obovate, 1.5–3.5 mm long, white, with a dark midrib; stalk 1–10 mm long, articulated near base. *Stamens* typical. *Ovary* obovoid, 3-grooved, yellow, with 4–6 ovules in each locule; style and stigmas short. *Berry* black, ± 5 mm in diameter, the dry perianth persistent, 1–3-seeded. Figure 6.

Widespread and common all over southern Africa except northern Namibia and northern Botswana; in bushveld under bush clumps. Flowering June to July. Map 9.

The branches are either spreading or suppressed (‘fox-tail’ habit adopted during dry conditions), and usually very spinous with straight spines. The old spiny stems remain standing for some time, thus protecting young, soft growth.

Vouchers: Brückner 487; Galpin M344; Giess & Müller 12215; Giess, Volk & Bleissner 7253; Jessop 675; Leistner 1099; Mogg 23696; Schlechter 8050; Schmitz 8303; Story 4869; Van Zinderen Bakker 1004; Ward 4434.





MAP 9.—*Protasparagus suaveolens*

8. *Protasparagus burchellii* (Bak.) Oberm., comb. nov. Syntypes: Cap. bon. spei, in aridis, *Burchell* 2962 (K, syn.; PRE, photo.); no locality given, *Zeyher* (*Asparagus* 10) (K, PRE, syn.); no locality given, *Cooper* 1647 (K).

Asparagus burchellii Bak.: 618 (1875); Bak.: 264 (1896).

A. stipulaceus auct. non Lam.: Bak.: 617 (1875); Bak.: 263 (1896).

A. suaveolens auct. non Burch. (1822): Jessop: 45 (1966) pro parte.

Perennials with stems and branches persistent, spreading and zigzagging horizontally, up to 1,5 m or more long, or straight, erect. *Rhizome* compact, woody; roots somewhat swollen above, cylindrical, long, ± 5 mm in diameter, hard. *Lateral branches* curving outwards to recurved, bearing recurved spines ± 5 mm long at regular intervals; on both sides of spines bracteate clusters of buds are produced, many of these developing into annual, globose, green, clustered branchlets, ± 10 –20 mm long; these in turn bearing small cladodes ± 1 –3 mm long in fascicles of $\pm (1)2$ or 3 and 1–3 apical flowers. *Flowers* shortly pedicelled (± 2 mm long) with the disc placed in lower half. *Perianth* with tepals ± 2 mm long. *Stamens* with filaments broadened below, anthers yellow. *Ovary* globose with 4

ovules in each locule; style and stigmas short. *Berry* ± 3 mm in diameter, green. Figure 7.

Occurs in south-western to eastern Cape and Transkei; in karroid thornveld, usually common where found. Flowering in autumn. Map 10.

A species with an unusual growth habit. The zigzagging stems, if unhampered, develop laterally, attaining a length of more than 1 m. Plants having erect, straight stems were seen near Uitenhage.

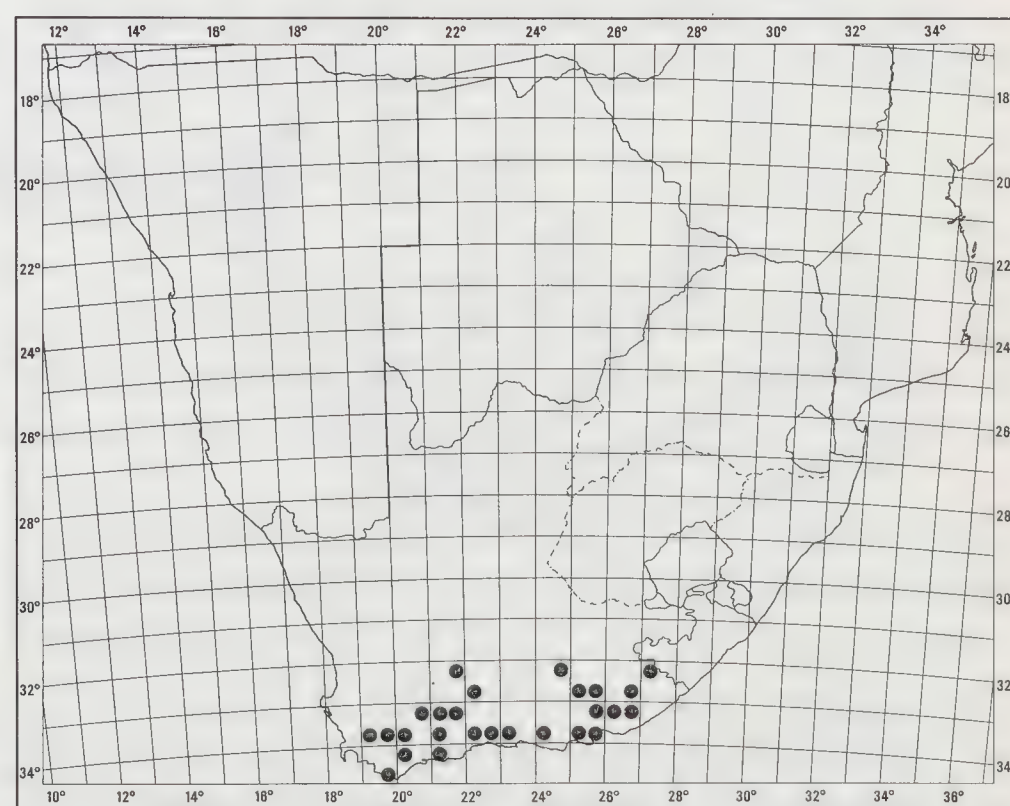
Vouchers: *Bayer* 3280; *Galpin* 3081; *Gibbs Russell* 3033; *Hall-Martin* 5964; *Jessop* 648; *Jessop* 674; *Mauve & Forrester* 5442.

9. *Protasparagus spinescens* (Steud. ex Roem. & Schult.) Oberm., comb. et stat. nov. Types: Cape Province, ex garden Ludwig (prob. C); Cape Province, Swartkops River Valley and adjoining hills from Villa Paul Maré to Uitenhage, *Zeyher* 4163 (PRE, lecto.!!; received from B, 1937).

Asparagus stipulaceus var. *spinescens* Steud. ex Roem. & Schult.: 317 (1829); Bak.: 265 (1896). *Asparagus spinescens* Steud. ex Roem. & Schult.: 334 (1829); Drège: 234 (1847). *Asparagopsis spinescens* (Steud.) Kunth: 93 (1850).

Asparagus suaveolens auct. non Burch. (1822): Jessop: 45 (1966) pro parte.

Erect shrub $\pm 0,35$ m high, with pale stems and dark olive-grey cladodes. *Stems* minutely



MAP 10.—*Protasparagus burchellii*

FIGURE 6.—*Protasparagus suaveolens*: 1, rhizome covered by cataphylls, $\times 0,5$; 2, stem, branches, cladode fascicles and apical flowers, $\times 1$; 3, flowering cladode fascicles, $\times 2$; 4, flower, $\times 10$ (ex Pretoria National Botanical Garden). Artist: R. Holcroft.

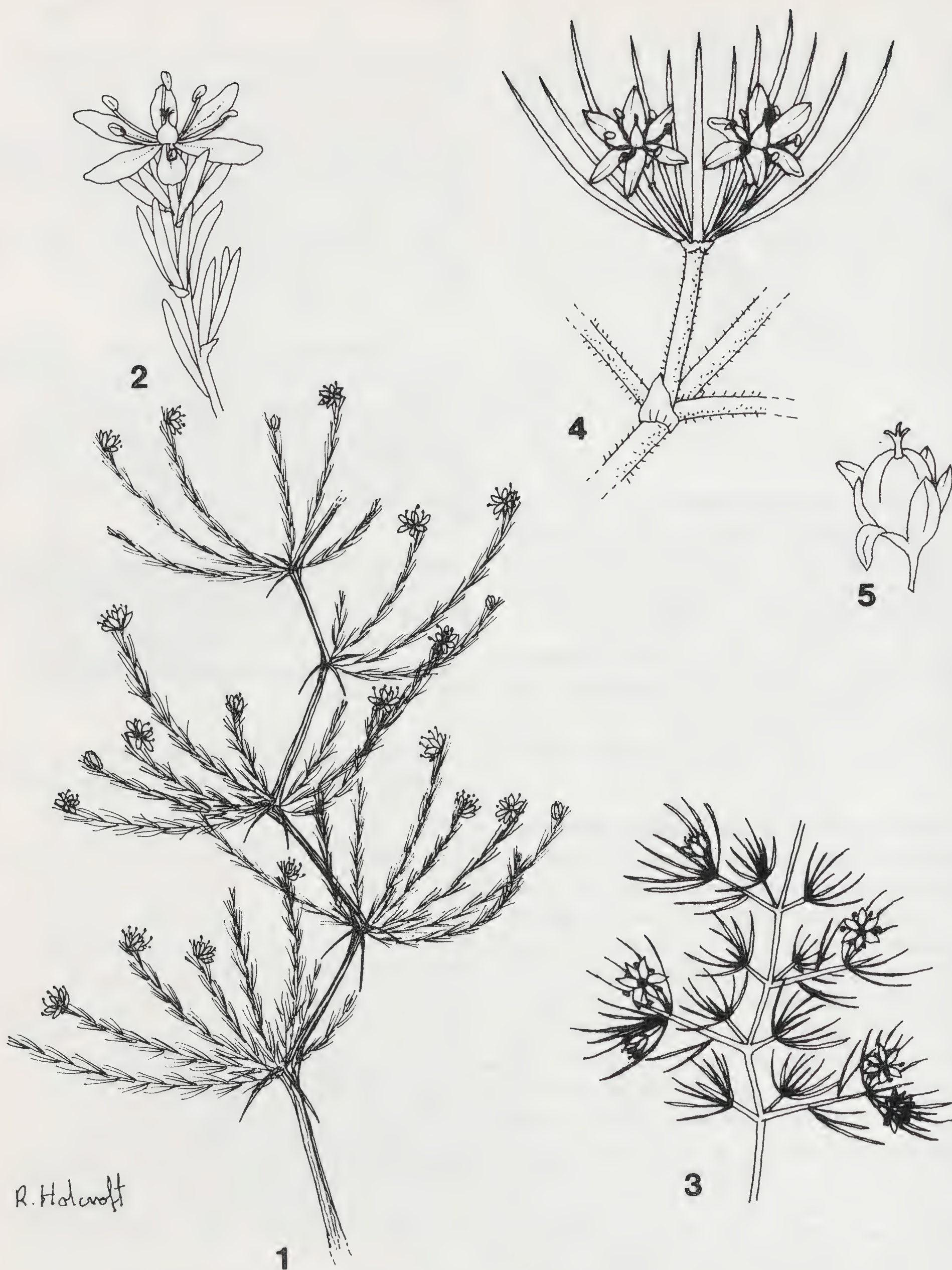


FIGURE 7.—*Protasparagus burchellii*: 1, flowering branch, $\times 1$; 2, flower, $\times 5$ (after Bayliss 2868). *P. flavicaulis*: 3, flowering branch, $\times 0,5$; 4, branch showing pubescent basal part and the twin flowering fascicles next to glabrous apical spine, $\times 5$; 5, berry, $\times 3$ (after Mogg 23696). Artist: R. Holcroft.

pubescent, pale grey. *Branches* ascending, placed close together. *Spines* flanking the branches at the axils and below the cladode fascicles, sharp, apex orange, usually bearing the cladode fascicles halfway. *Cladodes* terete, ± 7 mm long, smooth, obtuse above and apiculate, somewhat attenuated below. *Flowers* apical, 2–4, on spineless short branchlets, surrounded by a cladode fascicle; tepals $\pm 1,5$ mm long; stalks ± 3 mm long, disc placed near the base, where stalks are surrounded by small membranous bracts. *Stamens* with yellow anthers. *Ovary* with 4 ovules in each locule; style half as long as ovary. *Berry* globose, ± 4 mm in diameter, black, the perianth persistent.

Restricted to eastern Cape and Border areas; rare. Map 11.

Vouchers: *Archibald 5891*; *Galpin 2095*.

10. *Protasparagus exsertus* Oberm., sp. nov.
P. capensi (L.) Oberm. *affinis sed ramis longis sursum curvatis, spinis longis solitariis, floribus pedunculatis.*

Frutices vel chamaephyta, unicaules ad $\pm 0,8$ m alta. Rhizoma compacta, radicibus teretibus. Caulis plerumque ad nodos nudus. Rami tenui sursum curvati, aliquantum fractiflexi spinas exsertas tenues, solitarias ad 20 mm longas ferentes. Ramuli pauci vel multi, 15–20(–30) mm longi, cladodiis imbricatis tecti. Cladodia 3 mm longa, teretes, apiculata, minute dense puberula glauca. Flores apicales 1–2 in ramulis ad anthe-

sin modo exserti; tepala exteriora dorso pubescentia. Stamina flava. Ovarium ovulis 6 in quoque loculo; stylus et stigmata breves. Baccam non vidi.

Type: Cape, 3319 (Worcester): (–CB), Karoo Botanic Garden, shale hills, *Bayer 3286* (PRE, holo.).

Erect shrubs or chamaephytes with one ascending stem up to $\pm 0,8$ m high. *Rhizome* compact; roots cylindrical. *Stem* usually bare at the nodes, woody. *Branches* thin, curving upwards, somewhat zigzagging, bearing exserted, sharp, thin, solitary spines up to ± 20 mm long, rarely a short lateral spine may be present at the base; branchlets few to many at the nodes of the branches, 15–20(–30) mm long, covered by overlapping cladodes. *Cladodes* ± 3 mm long, terete, slightly swollen and obtuse above, apiculate, minutely and densely pubescent, dull green. *Flowers* apical, 1 or 2 on branchlets, just exserted at anthesis, outer tepals with a dorsal, broad, pubescent midrib; stalk ± 2 mm long, the disc 1 mm below perianth. *Stamens* yellow. *Ovary* with 6 ovules in each locule; style and stigmas short. *Berry* not seen.

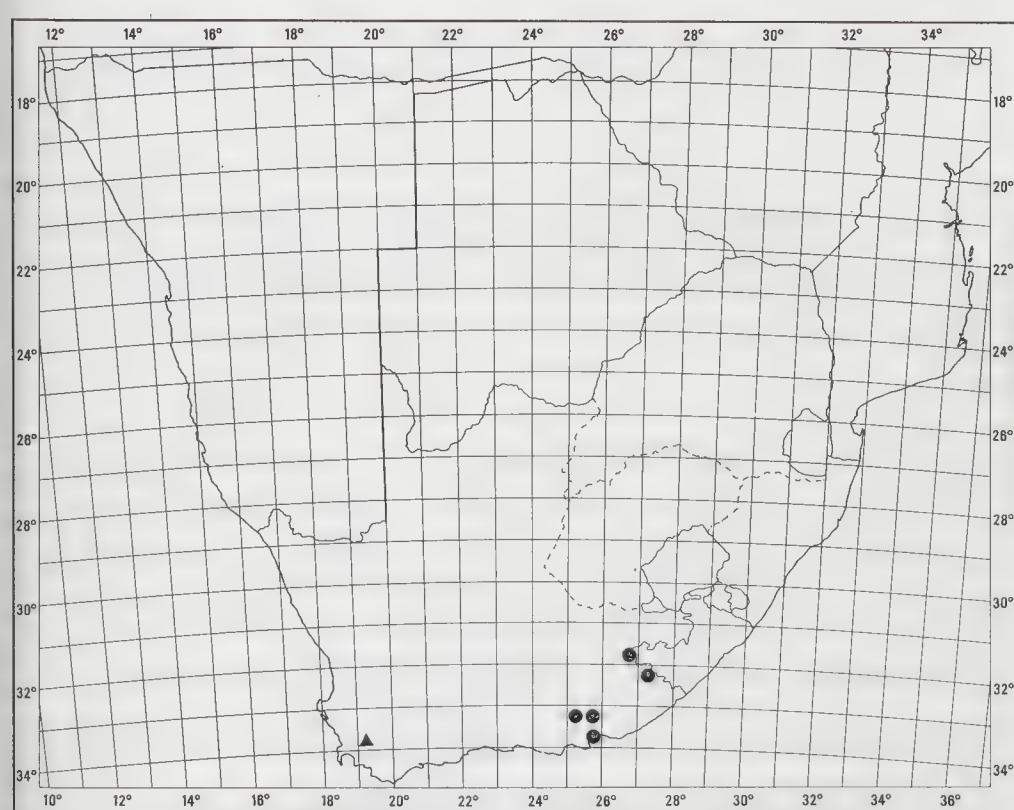
Present in the Karoo National Botanical Garden (Worcester) and surrounding areas; on shaly slopes. In its karroid habitat it was seen to stand out above the other vegetation (hence the specific epithet). Map 11.

This species differs from *P. capensis* (no. 4) in the long upcurved branches, the long solitary spines and the peduncled flowers.

Voucher: *Mauve & Hugo 87*.

11. *Protasparagus flavicaulis* Oberm., sp. nov. *a speciebus aliis subgeneris Protasparagus ramulis absentibus differt.*

Chamaephytum erectum ± 300 mm altum ramis adscendentibus. Rhizoma typicum lignosum radicibus duris teretibus. Caules erecti, dum iuvenes saturate lutei, demum fuscescentes, minute pubescentes. Rami ramulis brevibus crebris, in spina dura terminantes. Ramuli laterales 1–3 e nodo, breves, basin versus pubescentes (sicut caulis ramusque), pars superior spina laevis, 4–8 mm longa. Cladodia fasciculata, glabra vel setulosa, pauca vel multa, ad juncturam partium pubescentium et glabrarum spinae posita. Flores 1–3 erecti juxta fasciculum cladodiorum;



MAP 11. — ● *Protasparagus spinescens*
▲ *P. exsertus*

tepala anguste elliptica, ± 4 mm longa, alba; *pedicellus* ± 1 mm longus, disco prope basin perianthii. Stamina antheris luteis. Ovarium ovulis 4 in quoque loculo; brunneum vel nigrum, obovoidum; stylo brevi stigmatibus 3 brevibus. Bacca nigra, ± 5 mm diametro, perianthio persistente.

Type: Transvaal, 2627 (Potchefstroom): (–BB), southern side of Randburg, ridge, *Liebenberg* 8477 (PRE, holo.).

Erect chamaephyte ± 300 mm high with ascending branches. *Rhizome* typical, woody, with hard terete roots. *Stems* erect, minutely pubescent, deep yellow when young, darker with age. *Branches* ascending, bearing the short divergent side branches and branchlets close together, all ending in a hard spine. *Lateral branches* 1–3 from a node, short, the basal part pubescent (similar to stem and branch), the upper part a smooth spine, 4–8 mm long, thin aspinous branchlets bearing cladodes also present. *Bracts* membranous, shiny, apiculate, dentate. *Cladodes* fascicled, glabrous or setulose, few to many, placed at junction of pubescent and smooth areas of spine. *Flowers* 1–3, erect, beside a cladode fascicle, next to base of smooth spine; tepals narrowly elliptic, ± 4 mm long, white; stalk ± 1 mm long, disc broadened at or near base of perianth. *Stamens* with yellow anthers. *Ovary* with 4 ovules in each locule; brown to black, obovoid; style short with 3 short stigmas. *Berry* black, ± 5 mm in diameter, perianth persistent below. Figure 7.

Recorded from southern, western and central Transvaal and eastern Botswana, on rocky hillsides.

Two subspecies are recognized:

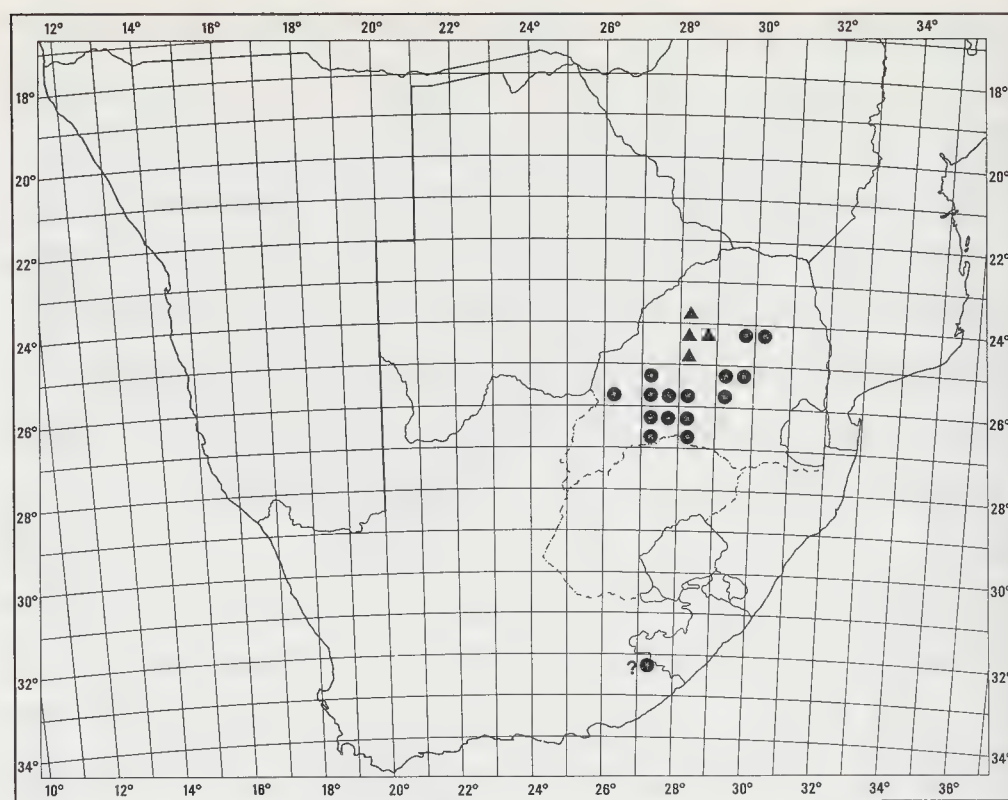
- Cladodes glabrous; widespread in Transvaal and eastern Botswana 11a. subsp. *flavicaulis*
 Cladodes setulose; north-western Transvaal
 11b. subsp. *setulosus*

11a. subsp. *flavicaulis*.

Cladodes smooth, glabrous.

Widespread and fairly common in Transvaal; on rocky hillsides in grassveld. Map 12.

Vouchers: Coetzee 335; Goossens 1633; Hillary & Robertson 544; Jacobsen 2434; Liebenberg 8477; Mogg 22805; Mogg 23696; Young 648; Young 1951.



MAP 12. — ● *Protasparagus flavicaulis* subsp. *flavicaulis*
 ▲ *P. flavicaulis* subsp. *setulosus*

11b. subsp. *setulosus* Oberm., subsp. nov. a subspecie typica cladodiis setulosis non glabris differt.

Type: Transvaal, 2328 (Baltimore): (–CC), Brown's Cutting south of Villa Nora, *Terminalia-Combretum* veld, on stony gentle slopes in sandy soil, Smook 4185 (PRE, holo.).

Differing from the typical subspecies in the characters given in the key.

This subspecies appears to be confined to north-western Transvaal and is as yet not often collected. It grows on rocky hillsides. Map 12.

Vouchers: Jacobsen 2434; Mauve 5443; Van Wyk 46.

12. *Protasparagus oliveri* Oberm., sp. nov. a omnibus speciebus aliis cladodiis absentibus differt.

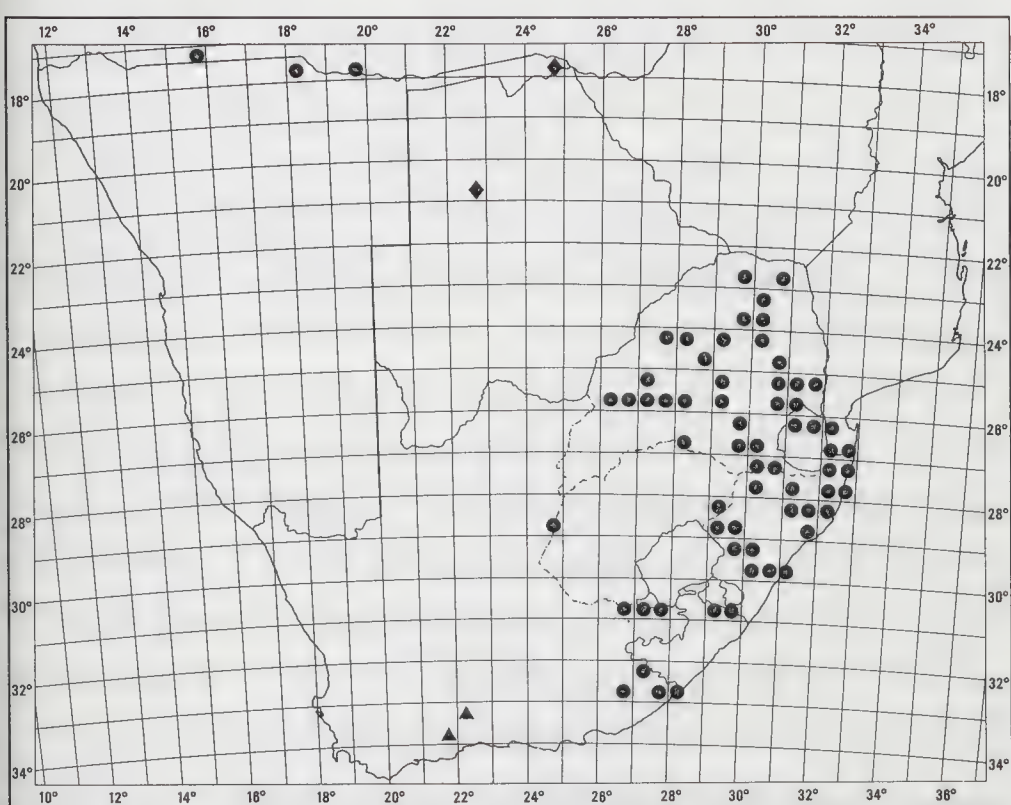
Plantae aggregatae, laete virides durae. Surculi plures, plus minusve cylindracei forma 'caudae vulpinae', ± 150 – 200 mm longi et cylindrus ± 20 – 30 mm diametro, lateraliter e rhizomate compacto evoluti. Radices teretes ± 4 mm diametro durae longae. Caules erecti, striati-pubescentes ramis ramulisque imbricatis, adscendentibus brevibus, in spinam longam acutam brunneam terminantes tecti. Flores solitarii vel pauci prope basin ramulorum siti, subsessili

disco parvo superpositi, bracteis minutis circumcincti; tepala succulenta persistentes basin baccae cingentes semi-ovoidea $\pm 1,5$ mm longa, apice obtuso, brunnea. Stamina cavo intra tepala appressa, dimidia longa. Stigmata 3 ad apicem divergentes. Bacca globosa, ± 3 mm diametro, nigra, ad apicem stigmatibus 3 perparvis divergentibus.

Type: Cape, 3321 (Ladismith): (—DA), Rooiberg, Oliver 5343 (STE, holo.; PRE).

Plants forming clumps, bright green, hard. Shoots several, \pm cylindrical and shaped like a foxtail, ± 150 – 200 mm long, and 20 – 30 mm in diameter, developing laterally from a compact rhizome. Roots terete, ± 4 mm in diameter, hard and long. Stems erect, covered by overlapping, ascending, short branches and branchlets, terminating in a long sharp, brown spine, striate-pubescent. Flowers 1–few, situated close to base of branchlets, subsessile, placed on a small disc, surrounded by minute bracts; tepals succulent, persistent, surrounding base of berry, semi-ovoid, $\pm 1,5$ mm long, apex obtuse, brown. Stamens appressed to hollow inside of tepals and about half as long. Berry globose, ± 3 mm in diameter, black; with 3 minute, divergent stigmas at apex.

Appears to be confined to the mountains of the Little Karoo; locally common where found, in areas often ravaged by fires. Flowering in November. Map 13.



MAP 13. — \blacktriangle *Protasparagus oliveri*
 \bullet *P. virgatus*
 \blacklozenge *P. pendulus*

Various letters and notes (in PRE) from Mr E.G.H. Oliver (after whom the species is named) emphasize the hardness of the whole plant. He also notes that the succulent-tepalled flowers do not appear to open, and that the stigmas of the closed flowers were covered with pollen.

Voucher: Vlok 587 (PRE).

13. *Protasparagus virgatus* (Bak.) Oberm., comb. nov.

Asparagus virgatus Bak.: t. 214 (1870); Bak.: 606 (1875); Bak.: 259 (1896); Jessop: 52 (1966). Type: Cape Province, Somerset East, Boschberg, Burchell 3197 (K, lecto.).

A. virgatus Bak. var. *capillaris* Bak.: 606 (1875); Bak.: 259 (1896). Type: Cape Province, Caffraria, Cooper 202.

Erect, stiff, herbaceous, spineless shrubs with thin, straight stems $\pm 0,75$ – $1,00$ m high, ending in fern-like spreading branches bearing the cladode fascicles. Rhizome compact, with thin creeping stolons forming colonies. Roots terete. Stems 1–few, slender, glabrous, quadrate, green; branches slim, curved upwards. Cladodes 1–3 (–7)-nate, filiform, ± 4 – 15 (– 25) mm long, unequal, maturing after flowering. Flowers solitary, pendulous, along the branches; tepals reflexed above, ± 5 mm long, inner broader than outer, with a few apical teeth, white; flower stalks ± 7 mm long, articulated in lower half, elongating in fruit. Stamens erect, forming a column around ovary and style. Ovary globose with 4 (–6) ovules in each locule; style just exerted at anthesis. Berry ± 5 mm in diameter, red.

Recorded from the summer rainfall region in southern Africa, in northern Namibia, Transvaal, Swaziland, O.F.S., Natal and north-eastern and eastern Cape; further north to Angola, Zimbabwe and Malawi; a common shade-loving species, usually growing under trees but occasionally found in the open. Evergreen in frost-free areas but a chamaephyte on the Highveld. Flowers have been recorded from September to January. Map 13.

The species has been introduced into Kirstenbosch National Botanical Garden as a ground cover below large trees, where its soft plumose appearance is very pleasing. It is grazed by stock and antelope.

Protasparagus virgatus appears to be a primitive species of this genus. The recurved tepals and the erect stamens surrounding the style suggest that *Myrsiphyllum* might have developed from a similar ancestor.

Vouchers: Acocks 9336; Devenish 407; Flanagan 1292; Jacobsz 791; Moll 2870; Nel 133; Pole Evans 168; Rodin 9086.

14. *Protasparagus pendulus* Oberm., sp. nov. *P. virgato* (Bak.) Oberm. *affinis sed floribus 1–2 apicalibus differt.*

Herbae (chamaephyta) erectae aspinosae glabrae griseo-virides $\pm 0,3–0,4$ m altae. Rhizoma compactum; radices multae, teretes, ± 3 mm diametro, durae, velamine ex radicibus capillaceis constanti tectae. Caules erecti costati, minute strigosi; rami patentes; ramuli ad angulum 90° patentes, 20–30 mm longi, dense tecti fasciculis imbricatis cladodiorum. Cladodia mollia, in quoque fasciculo ± 5 , filiformia, subcurvata, inaequilonga, 5–10 mm longa. Flores 1 vel 2 ad apicem ramulorum, penduli; tepala anguste oblonga, ± 4 mm longa, nivea vel 'sordide alba'; pedicellus recurvatus, ± 4 mm longus, supra medium articulatus. Stamina tepalis breviora, antheris flavis. Ovarium oblongo-globosum, ovulis in quoque loculo 6. Stylus ovario \pm aequilongus, ramis brevibus 3, stigmatibus apicalibus. Baccam non vidi.

Type: Namibia, 1724 (Katima Mulilo: –DC), Caprivi Strip, 9 miles north of Ngomo area, Killick & Leistner 3014 (PRE, holo.; WIND).

Erect, nonspinous, glabrous, greyish green herbs (chamaephytes), $\pm 0,3–0,4$ m high. *Rhizome* compact. *Roots* numerous, terete, ± 3 mm in diameter, hard, covered by a velamen of root hairs. *Stems* erect, ribbed, minutely strigose; branches spreading; branchlets at right angles to branches, 20–30 mm long, closely beset by overlapping cladode fascicles. *Cladodes* soft, ± 5 per fascicle, filiform, slightly curved, unequally long, 5–10 mm long. *Flowers* 1 or 2 at apex of branchlets, pendulous; tepals narrowly oblong, ± 4 mm long, white or off-white; stalk recurved, ± 4 mm long, articulated above middle. *Stamens* shorter than tepals; anthers yellow. *Ovary* oblong-globose; ovules 6 in each locule; style about as long as ovary with 3 short branches and apical stigmas. *Berry* not seen.

Recorded from the Caprivi Strip and northern Botswana; also in Zimbabwe and Zambia; in mopane woodland, *Combretum-Acacia* savanna and along the Zambezi River. Flowering in December. Map 13.

Related to *P. virgatus* (no. 13) but differs in that the 1(2) pendulous flowers are apical on the branches or branchlets. In *P. virgatus* they are placed all along the branches.

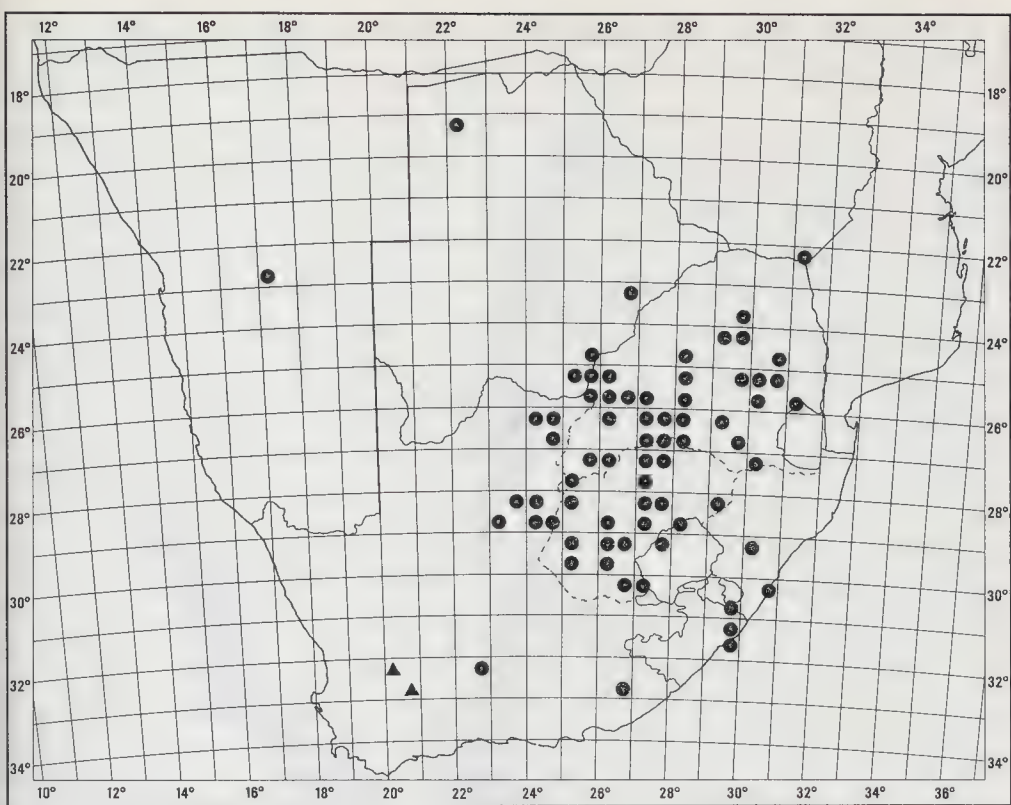
Vouchers: Angus 1030; Curson 393; Jacobsen 3396.

15. *Protasparagus mollis* Oberm., sp. nov. *P. virgato* (Bak.) Oberm. et *P. pendulo* Oberm. *affinis sed scandens, caulibus ramisque mollibus laxè curvatis, cladodiis brevioribus, flore 1, raro 2, prope basin ramuli.*

Plantae molles graciles glabrae scandentes floribus solitariis pedunculatis e fasciculis brevibus cladodiorum exsertis. Rhizoma cylindricum radicibus longis solidis teretis crebris. Caules ramique laxè curvati, tenues, brunneo-nitentes; ramuli breves, fasciculos parvos cladodiorum et flores solitarios exsertos laterales ferentes. Bractee ramos ramulosque subtendentes innocuae membranaceae, base obtusa vel acuta. Cladodia in quoque fasciculo 10–12, filiformia, subcurvata, inaequilonga, ad 7 mm longa, apiculata, scabro-recutita (oculo armato visa); bractea subtendens membranacea, parva. Flores solitarii, penduli; tepala anguste oblonga ± 5 mm longa; pedunculo ± 5 mm longo, parum infra medium articulo. Stamina erecta. Bacca ± 5 mm diametro, testacea; semen 3 mm diametro, ater.

Type: Cape, 3419 (Caledon): (–BC), Jagerskraal, on dwyka tillite, Bayer 3983 (PRE, holo.).

Soft, slender, glabrous climbers with solitary, pedunculate flowers exserted from short cladode fascicles. *Rhizome* cylindrical, bearing long, firm, terete roots placed close together. *Stems* and branches laxly curved, thin, shiny brown; branchlets short, bearing the small cladode fascicles and solitary, exserted lateral flowers. *Bracts* subtending branches and branchlets innocuous, membranous, base obtuse or acute. *Cladodes* 10–20 in a fascicle, filiform, somewhat curved, unequally long, up to 7 mm long, apiculate, rough-skinned (when magnified); the subtending bract membranous, small. *Flowers* solitary, pendulous, numerous placed along lower part of young branchlets, (the immature cladodes placed in upper half); tepals narrowly oblong, ± 5 mm long, white with a dark midrib, forming a loose tube below; upper half recurved at anthesis; stalk usually recurved, ± 5 mm long, articulated below middle. *Stamens* erect, exserted, forming a loose tube, anthers deep yellow.



MAP 14. — ▲ *Protasparagus mollis*
● *P. laricinus*

Ovary with 8 ovules in each locule; ovoid; style just exerted above stamens, stigma apical, small. *Berry* ± 5 mm in diameter, brownish yellow, transparent when ripe; seed ± 3 mm in diameter, black with a rough skin.

Occurs in south-western Karoo, on Dwyka tillite. Map 14.
The specific epithet refers to the softness of the plant.
Voucher: *Bayer 4314*.

16. *Protasparagus laricinus* (Burch.) Oberm. in South African Journal of Botany 2: 244 (1983). Type: Cape Province, Hay, between Griquatown and Wittewater, *Burchell 1871* (K, holo.!; PRE, photo!).

Asparagus laricinus Burch.: 537 (1822); Bresler: 40 (1826); Roem. & Schult.: 337 (1829); Kunth: 75 (1850); Bak.: 620 (1875); Bak.: 267 (1896); Sölch *et al.*: 31 (1966); Jessop: 60 (1966).

Erect, much branched, spiny shrubs $\pm 2,0$ – $2,5$ m high, with the young stems and branches shallowly zigzagging, ribbed, whitish, minutely hispidulous or glabrous, turning brown and smooth with age. *Rhizome* typical. *Roots* cylindrical, thick. *Spines* short, hard, straight or slightly curved, present on stems, branches and below cladode fascicles. *Cladodes* on branches and branchlets, up to 60 in a fascicle, filiform, up to 35 mm long when mature, fairly equal in length, shorter in some forms. *Flowers* 1–8, on

outside of cladode fascicles; tepals loosely spreading, white; stalks articulated below centre. *Stamens* with red or orange anthers. *Ovary* with ± 6 ovules in each locule; style short with 3 short, spreading stigmas. *Berry* ± 5 mm in diameter, red, usually pendulous, tipped by the short style. Figure 8.

Widespread and common in the summer rainfall region, in central Namibia, south-eastern Botswana, Transvaal, O.F.S., Natal, Lesotho, Transkei and eastern and northern Cape; further north to the subtropics. Generally prefers fairly damp localities. Flowering in spring and summer. An important bee plant rich in pollen and nectar. Map 14.

The Tswanas strip and clean the stems and these are then plaited into mats which serve as doors.

Vouchers: *Dieterlen 406*; *Hansen 3257*; *Jessop 626*; *Rogers 6254*; *Verdoorn 508*.

17. *Protasparagus bechuanicus* (Bak.) Oberm., comb. nov.

Asparagus bechuanicus Bak.: 429 (1898). Type: Botswana, Nakalechwe, *Lugard 25* (K, holo.; PRE, photo!).

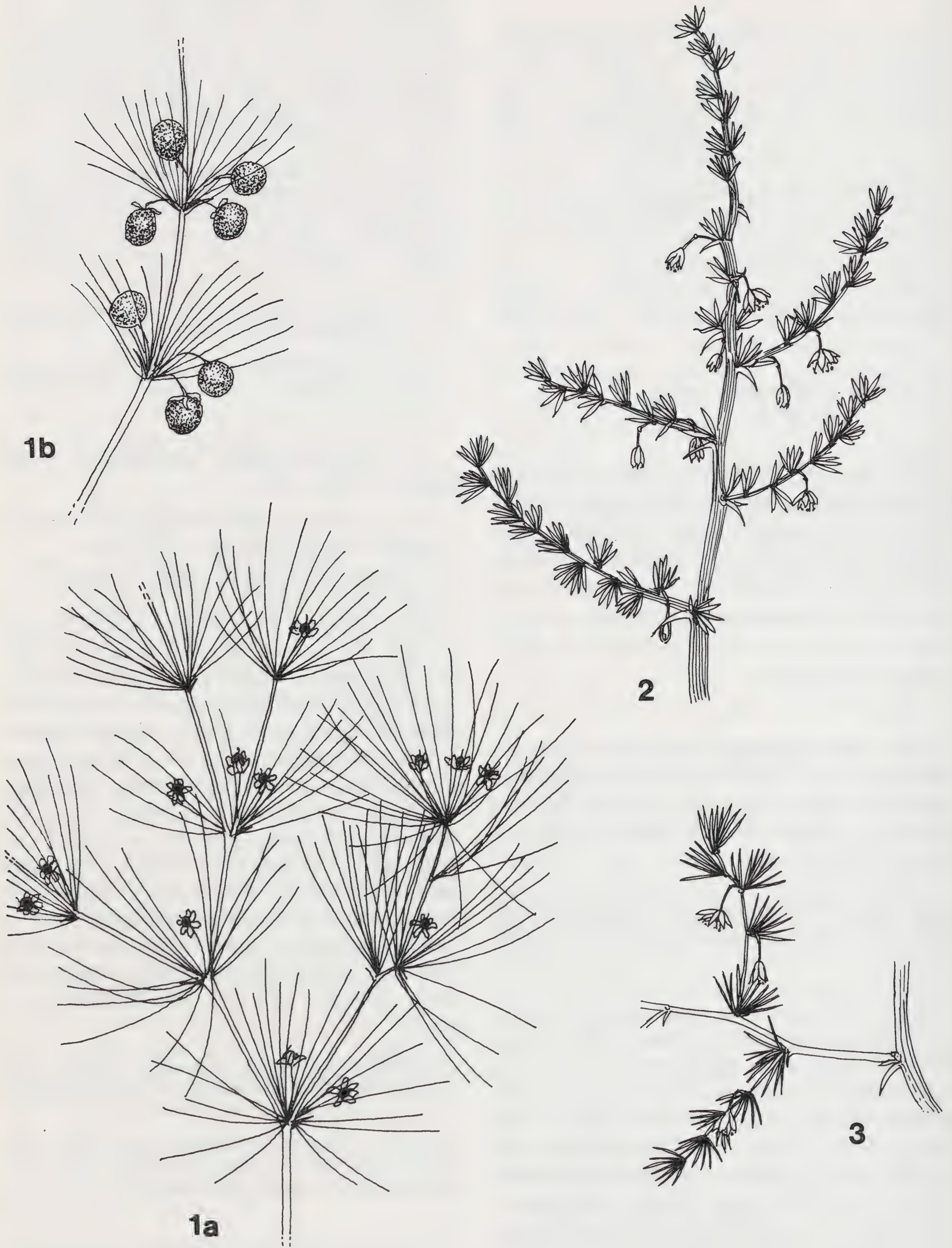
A. africanus auct. non Lam.: Jessop: 48 (1966).

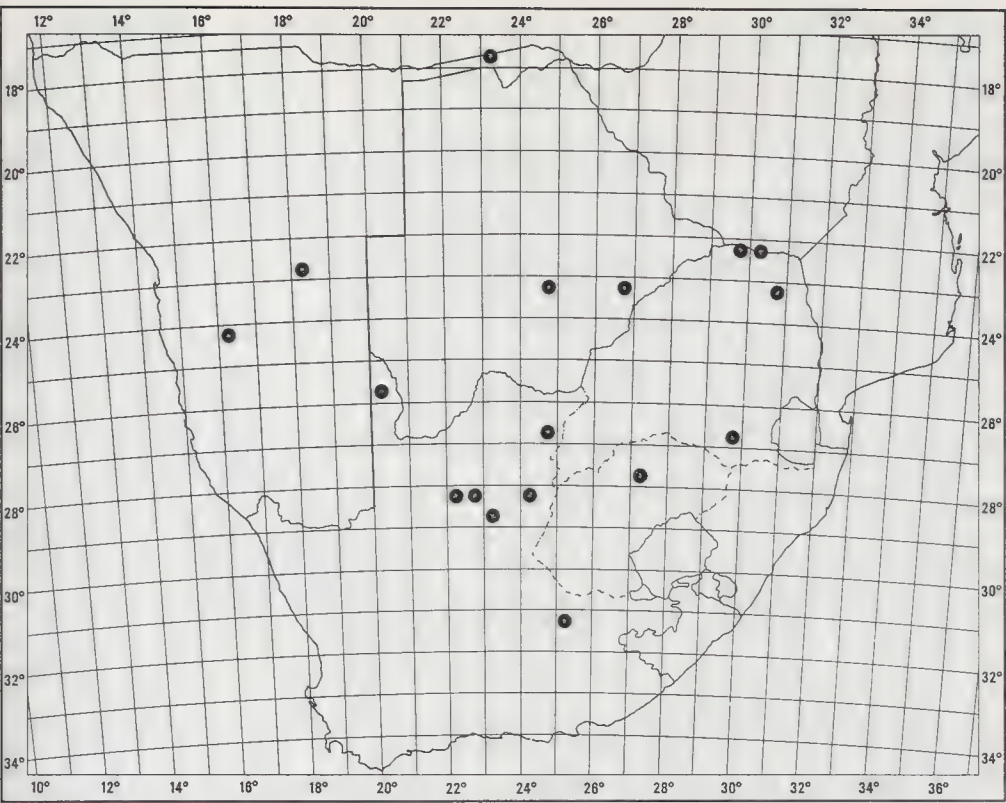
Erect, rounded, greyish green shrubs 0,4–0,6 m high, glabrous or minutely puberulous; the spreading branches and branchlets often ending in obtuse bare tips. *Rhizome* and roots not seen. *Stems* branching, hard, smooth. *Spines* exerted, 5 mm long, sharp, from a broad base, or suppressed. *Branches* and branchlets spreading and widely spaced along stems. *Cladodes* terete, 4–6(–10) mm long, apiculate, in fascicles of 4–12, surrounded at the base by a cluster of small, membranous, ciliate bracts. *Flowers* 1–several, placed inside cladode fascicles; tepals ± 2 mm long; stalk ± 4 mm long, articulated in lower half. *Ovary* with 4 ovules in each locule. *Berry* globose, ± 3 mm in diameter, red to orange.

Recorded from Namibia, Botswana, northern Cape, Transvaal, Natal, O.F.S. and eastern Cape; on red sand dunes, mopane veld or usually in dry grassveld. Map 15.

Vouchers: *Acocks H1093*; *Codd 4858*; *Curson 196*; *Curson 1212*; *Hardy 1959*; *Henrici 1709*; *Leistner 1009*; *Leistner 1887*; *Leistner 2958*; *Liebenberg 8968*; *Pont 190*.

18. *Protasparagus cooperi* (Bak.) Oberm. in South African Journal of Botany 2: 243 (1983).





MAP 15.—*Protasparagus bechuanicus*

Syntypes: Cape Province, without precise locality, *Cooper s.n.* ex Hort. Saunders 7/71 K, *Asparagus* 1449 (K, syn.; PRE, photo.); Cape Province, Boschberg, *MacOwan* 1810 (K, syn.).

Asparagus cooperi Bak.: 818 (1874); Bak.: 613 (1875); Bak.: 263 (1896); Phillips: t. 503 (1933).

A. burkei Bak.: 607 (1875); Bak.: 261 (1896). Type: Transvaal, Crocodile River, *Burke s.n.* (K, holo.; PRE, photo.).

A. fleckii Schinz: 43 (1896). Type: Namibia, Rietfontein, *Fleck* 238 (Z, holo.; PRE, photo.).

A. judtii Schinz: 44 (1896). Type: Namibia, Hoachanas, *Fleck* 901 (AZ, holo.; PRE, photo.).

A. conglomeratus Bak.: 428 (1898); non Bak. (1904). Type: Botswana, Kwebe, *Lugard* 52 (K, holo.; PRE, photo.).

A. lugardii Bak.: 431 (1898). Type: Botswana, near Lake Ngami, *Lugard* 31 (K, holo.; PRE, photo.).

A. dinteri Engl. & Krause: 155 (1910). Type: Namibia, bei Neitsas, *Dinter* 676 (B, SAM).

A. patens Krause: 448 (1914). Type: Namibia, at Haribis, 40 km SW of Mariental, *Engler* 6570 (B, holo.; PRE, photo.).

A. francisci Krause: 449 (1914). Type: Namibia, between Omuramba and Omatako, *Seiner* 689a (B, holo.; PRE, photo.).

A. rivalis Burch. ex Kies: 179 (1951b). Type: Cape Province, Kosiefontein, *Burchell* 1587 (K, holo.; PRE, photo.).

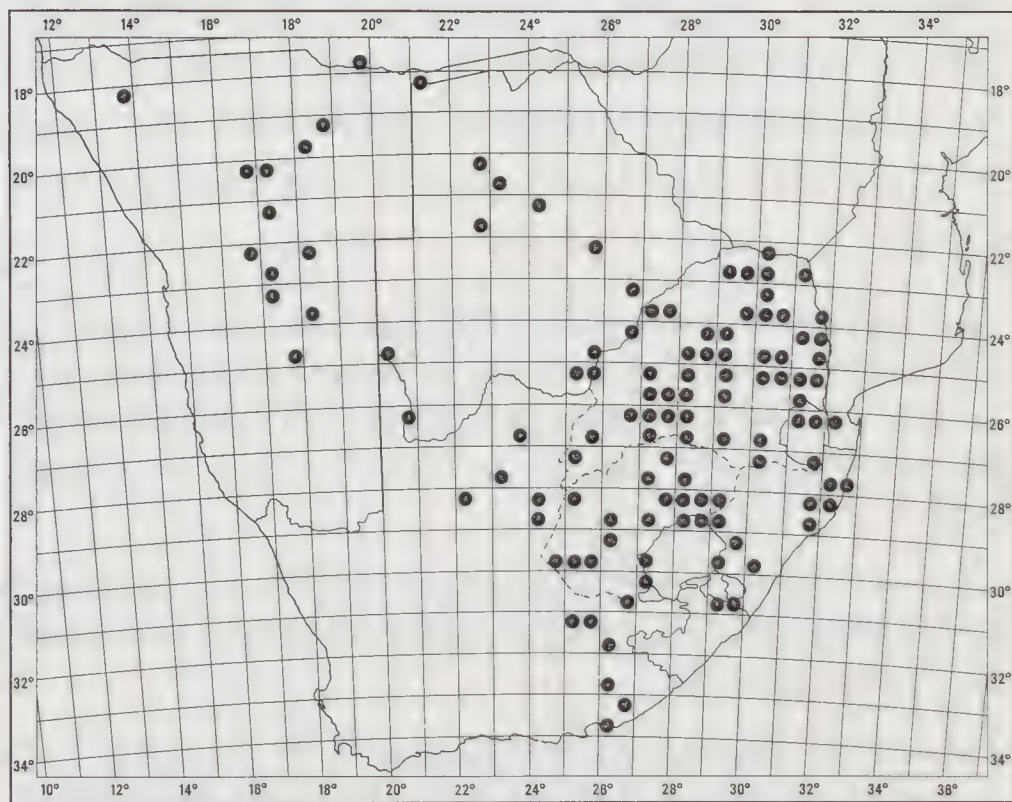
A. asiaticus auct. non L. (1753): Bak.: 618 (1875); Bak.: 265 (1896).

Scandent, glabrous or pubescent chamaephytes 2–5 m high, bearing supple, curved branches. *Rhizome* typical with terete roots. *Stems* erect below with short sharp spines, twining above. *Branches* long, spreading, sometimes flowering before cladodes appear. *Cladode fascicles* maturing later in season, becoming very dense; cladodes filiform, (5–)10–20 mm long. *Flowers* inside cladode fascicle, few to numerous, with a strong sweet scent; tepals \pm 2,5 mm long, white with a green midrib; stalks \pm 5–10 mm, articulated near base. *Stamens* with yellow anthers. *Ovary* with 4 ovules in each locule; obovoid, dark green. *Berry* \pm 5 mm in diameter, red.

A widespread common species in the summer rainfall region, in Namibia, Botswana, Transvaal, Swaziland, O.F.S., Lesotho, Natal, Transkei and north-western and eastern Cape; to tropical Africa. Grows in bush or exposed places, sometimes in disturbed soil, e.g. in the railway reserve. Map 16.

Vouchers: *Abner* 30; *Acocks* 10648; *Curson* 752; *Devenish* 1848; *Dieterlen* 346a; *Gemmell* 4955; *Gerstner* 160; *Giess* 11355; *Gill* 87; *Hilliard & Burt* 13759; *Jessop* 653; *Kies* 368; *Leistner* 1137; *Mogg* 5177; *Reid* 112; *Rodin* 2713; *Rogers* 6252; *Story* 4690; *Thode* 1648; *Wild* 5097.

19. *Protasparagus africanus* (Lam.) Oberm. in South African Journal of Botany 2: 243 (1983).



MAP 16.—*Protasparagus cooperi*

FIGURE 8.—*Protasparagus laricinus*: 1a, flowering branch, \times 1 (after Hansen 3257); 1b, in fruit, \times 1 (after Curson 372). *P. microrhaphis*: 2, flowering branch, \times 1 (after Moll 1286). *P. concinnus*: 3, flowering branch, \times 1 (after Devenish 1844). Artist: G. Condry.

Type: Cape, without precise locality, *Sonnerat s.n.* (P, holo.; PRE, photo!).

Asparagus africanus Lam.: 295 (1783); Bresler: 9 (1826); Roem. & Schult.: 331 (1829); Bak.: 619 (1875); Bak.: 265 (1896); Marloth: t. 20 (1915); Salter: 175 (1940); Kies: 177 (1951b); Jessop: 48 (1966).

Asparagopsis lamarckii Kunth: 87 (1850), nom. illegit. Type: as for *Asparagus africanus*.

Asparagus dependens Thunb.: 66 (1794). Type: none given in Thunb. (1794) or (1823). Lectotype: sheet 8442 in UPS. This name is not treated by Obermeyer in the original manuscript of this treatment, but is treated as a synonym of *Asparagus africanus* by Baker (1896) and Jessop (1966), and of *A. juniperinus* fide Moss in a note on the type specimen. It is placed in synonymy here by Immelman, a decision based on the microfiche of the type specimen.

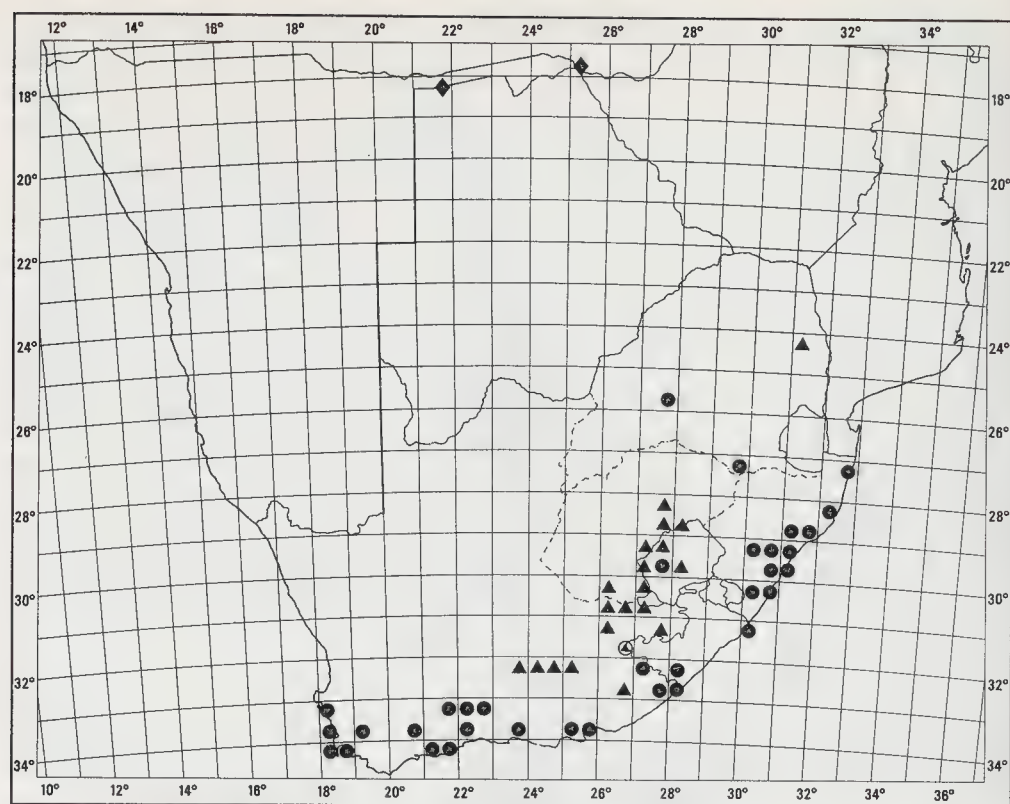
Plant erect when stems young, later scrambling and up to 0,6 m or more high. *Rhizome* typical, bearing thin, rough roots. *Stems* many, pubescent or glabrous, smooth, green with spreading branches and branchlets, often closely beset with cladode fascicles. *Spines* straight or reflexed, sharp, reddish brown with the scale leaves above similar in colour, present below branches, branchlets and cladode fascicles. *Cladodes* ± 12 per fascicle, filiform, slightly curved, apiculate, unequally long, the longest up to 10 mm. *Flowers* up to ± 6 in each cladode fascicle; tepals narrowly obovate, $\pm 3-4$ mm long, whitish; stalk ± 5 mm long, articulated in lower half. *Stamens* with small yellow anthers. *Ovary* with 4 ovules in each locule; obovoid; style and stigmas very short. *Berry* ± 5 mm in diameter, orange.

Recorded from south-western Cape to Natal, from Saldanha Bay north as far as Sordwana Bay in Natal and into the south-eastern Transvaal; growing mainly near the coast but also occasionally further inland; occurs in fairly moist places. Map 17.

Can be distinguished from related species by, inter alia, the presence of small, reflexed, reddish brown spines below the cladode fascicles.

Vouchers: Boucher 4170; Flanagan 255; Fourcade 552; Gerstner 2405; Jessop 660; Marloth 7319; Pegler 9; Schlechter 9218; Thompson 3587; Zeyher 178.

20. *Protasparagus longicladus* (N.E. Br.) B. Mathew in Kew Bulletin 44,1: 181 (1989). Type: Zimbabwe, Victoria Falls, F.A. Rogers 3523 (K, holo.; PRE, photo!).



MAP 17.—● and ○ *Protasparagus africanus*
◆ *P. longicladus*
▲ and △ *P. denudatus*

Asparagus longicladus N.E. Br.: 298 (1921).

Scandent or shrubby, tall. *Rhizome* and roots not seen. *Stems* and branches minutely pubescent, grey to brown. *Spines* short, broad, exserted. *Cladodes* in dense fascicles, filiform, 25–50 mm long, soft. *Flowers* in dense, sessile, globose fascicles pressed against the stems amongst cladodes; bracts small, numerous; tepals ± 3 mm long, white; stalk ± 8 mm long, articulated near base. *Stamens* typical; anthers yellow. *Ovary* with 4 ovules in each locule; obovoid; style short with 3 broad, recurved stigmas. *Berry* ± 7 mm in diameter.

Recorded from Namibia (Caprivi Strip) and north-western Botswana; also from Zimbabwe and Zambia, often collected around Lake Kariba; rocky hills in woodland. Map 17.

According to notes on Kerfoot 7464, this species is 'A thorny scrambler of variable form; it may form dense masses in canopies of trees'.

Vouchers: Killick & Leistner 3362; Larson 60 (J); Kerfoot 7379 (J); Kerfoot 7464 (J, photostat in PRE).

21. *Protasparagus denudatus* (Kunth) Oberm. in South African Journal of Botany 2: 243 (1983). Type: Cape Province, Queenstown, Stormberg, Drège 3533 (B, holo.; BOL, lecto.; MO).

Asparagopsis denudatus Kunth: 82 (1850). *Asparagus denudatus* (Kunth) Bak.: 606 (1875); Bak.: 258 (1896); Jessop: 52 (1966), excl. synonyms.

Erect, much branched coppicing shrubs (chamaephytes), 1.0–1.5 m high, appearing almost 'leafless' at times, as the small cladodes are widely spaced and deciduous in late winter to December. *Rhizome* compact, woody, covered by acute cataphylls; roots terete, long. *Stems* several, old and young, bearing a few innocuous appanate spines near the base. *Branches* curving upwards with many widespreading branchlets. *Cladode fascicles* placed far apart on branchlets, with 2–4 filiform cladodes, cladodes 2–4 mm long, appearing after flowering (January to July), deciduous. *Flowers* 2–4, in apical umbels, on short bare branchlets with occasional flowers lower down; tepals 3 mm long, cream or white with a green median stripe; stalks \pm 4 mm, articulated in lower half. *Stamens* with yellow anthers. *Ovary* with \pm 6 ovules per locule; obovoid, dark; style short. *Berry* \pm 6 mm in diameter, red or greyish black.

Recorded from south-eastern O.F.S., Lesotho and north-eastern Cape; usually in rocky situations, often on riverbanks. Flowering October to November; in fruit December; with cladodes January to June. Map 17.

Vouchers: *F. Bolus* 151; *Comins* 1741; *Dieterlen* 828; *Galpin* 2092; *Galpin* 13881; *Gerstner* 121; *Jarman* 5; *Oliver* 5199; *Peeters*, *Gericke* & *Burelli* 298; *Schmitz* 7527.

22. *Protasparagus pearsonii* (Kies) Oberm. in South African Journal of Botany 2: 244 (1983). Type: Namibia, Ramans Drift, *Pearson* 4003 (K, holo.; PRE, SAM, iso.!, PRE, photo.!).

Asparagus pearsonii Kies: 179 (1951b).

A. abyssinicus auct. non Hochst. ex A. Rich.: H. Bol., L. Bol. & Glover: 103 (1915); R. Wordsworth *et al.*: 33 (1923).

A. denudatus auct. non Kunth (1850): Jessop: 52 (1966); Sölch *et al.*: 30 (1966).

Erect or straggling, innocuous, pale yellow-green, hard suffrutex up to \pm 1 m high with stout basal stems and lax divaricate branches, often entangled above. *Rhizome* and roots not seen. *Stems* minutely and densely striate-papillate, glabrous with age. *Branches* and branchlets laxly spreading or deflexed, occasionally clustered on a swollen node. *Spines* absent or poorly developed at base of stem. *Cladodes* in fascicles of 2–6, filiform, variable in size, up to 25 mm long, deciduous. *Flowers* appearing before or

contemporary with cladodes, few to several in terminal umbels on short branchlets, occasionally some on the peduncle below; tepals \pm 3 mm long, cream with a green keel; stalk \pm 3–7 mm long, articulated near the base, occasionally with 2 nodes. *Stamens* with yellow or orange anthers. *Ovary* with \pm 6 ovules per locule; globose, brown; style and stigmatic branches short. *Berry* \pm 10 mm in diameter, blue to black.

Widespread in southern Namibia and in north-western Cape; common on sandy flats in cracks of boulders, or near watercourses. It appears to flower in late summer after rains, the cladodes maturing later. Map 18.

Vouchers: *Giess* 9675; *Kinges* 2169; *Leistner* 1770; *Ortendahl* 83; *Wanntorp* 1003; *Werger* 320.

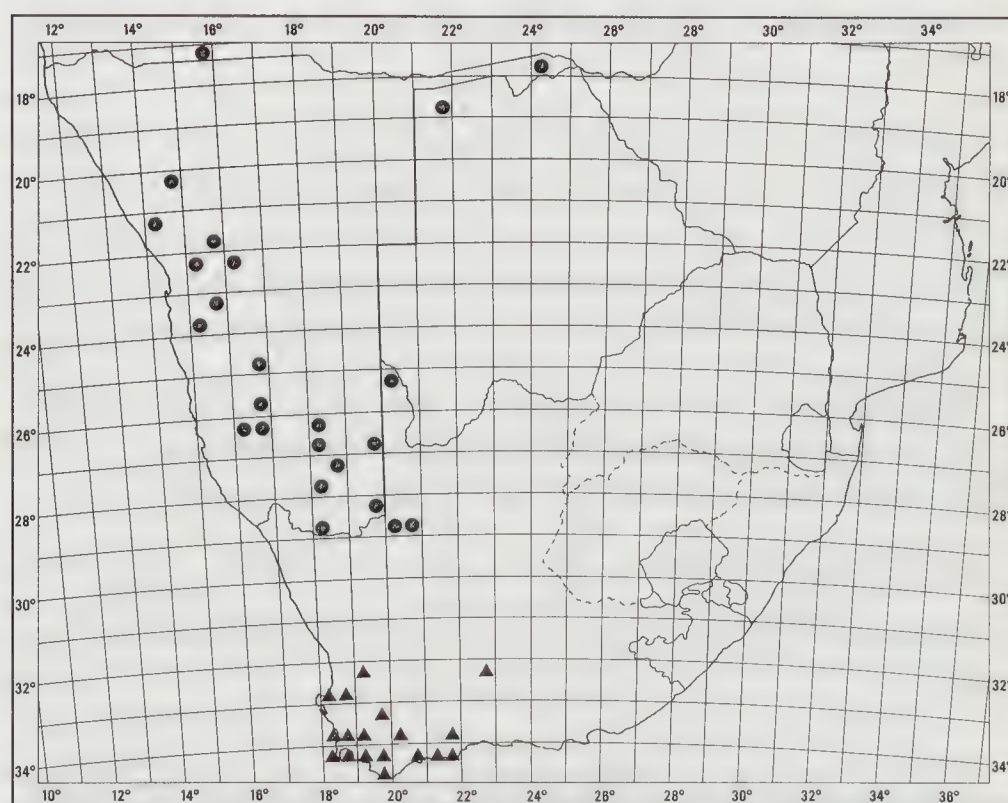
23. *Protasparagus lignosus* (Burm. f.) Oberm., comb. nov. Type: Cape, *Garcin s.n.* (G, Burman herb., holo.; PRE, xerox copy).

Asparagus lignosus Burm. f.: 10 (1768).

A. compactus Salter: 165 (1940); Salter: 175 (1950); Kies: 179 (1951b); Jessop: 59, fig. 1a (1966). *P. compactus* (Salter) Oberm.: 243 (1983). Type: Cape Province, Cape Peninsula, Orange Kloof, *Wolley-Dod* 2521 (BOL, holo.!).

A. africanus Lam. var. *wrightii* Bak.: 619 (1875); Bak.: 266 (1896). Type: Cape Province, Simons Bay, *Wright* 454.

Rigid, erect, glabrous, evergreen, shrublets, \pm 0.6 m high, very spiny. *Rhizome* compact, bearing numerous long, cylindrical roots. *Stems* erect, grooved, branching frequently, pale grey



MAP 18. — ● *Protasparagus pearsonii*
▲ *P. lignosus*

or white, becoming brown and smooth with age. *Spines* sharp, exserted, ± 5 mm long, progressively shorter on branches and the shallowly zigzagging branchlets. *Cladodes* terete, $\pm 12-20$ (-45) mm long, grooved when dry, apiculate, glaucous green, the base flattened into a small yellow disc. *Flowers* 1-4, inside apical cladode fascicle of the branchlets, tepals 2-4 mm long, white. *Stamens* with orange anthers. *Ovary* with 5 or 6 ovules in each locule. *Berry* 1-3-seeded, 6-9 mm in diameter, red.

Winter rainfall region, from the Cape Peninsula to Still Bay, Beaufort West and Porterville, often gregarious; a fynbos species common on the Peninsula, in rocky and sandy areas, coastal renosterveld and marshy flats. Flowering from February to April and October to November, according to records. Map 18.

Vouchers: Bayer 3320; Bohnen 8089; Boucher 4154; Gibbs Russell, Robinson & Herman 429; Marloth 9491; Salter 8268; Schlechter 10364; Thompson 258; Williams 3192.

24. *Protasparagus rubicundus* (Berg.) Oberm. in South African Journal of Botany 2: 244 (1983). Type: Caput Bonae Spei, comm. Grubb (SBT, holo.; PRE, photo!).

Asparagus rubicundus Berg.: 88 (1767); Jessop: 60, fig. 9 (1966).

Asparagus ruber Burm. f.: 10 (1768). Type: Cape (G-Burmann herb., holo.; PRE, xerox!).

Asparagus thunbergianus Schult.: 333 (1827); Bak.: 615 (1875); Bak.: 262 (1896); Salter: 175 (1940); Jessop: 55 (1966); Mason: t. 10,3 (1972). *Asparagopsis thunbergii* Kunth: 85 (1850), nom. illegit. Type: Cape Province, Cape Peninsula, *Thunberg s.n.* (UPS No. 8448, holo.; BOL, photo!, PRE, photo!).

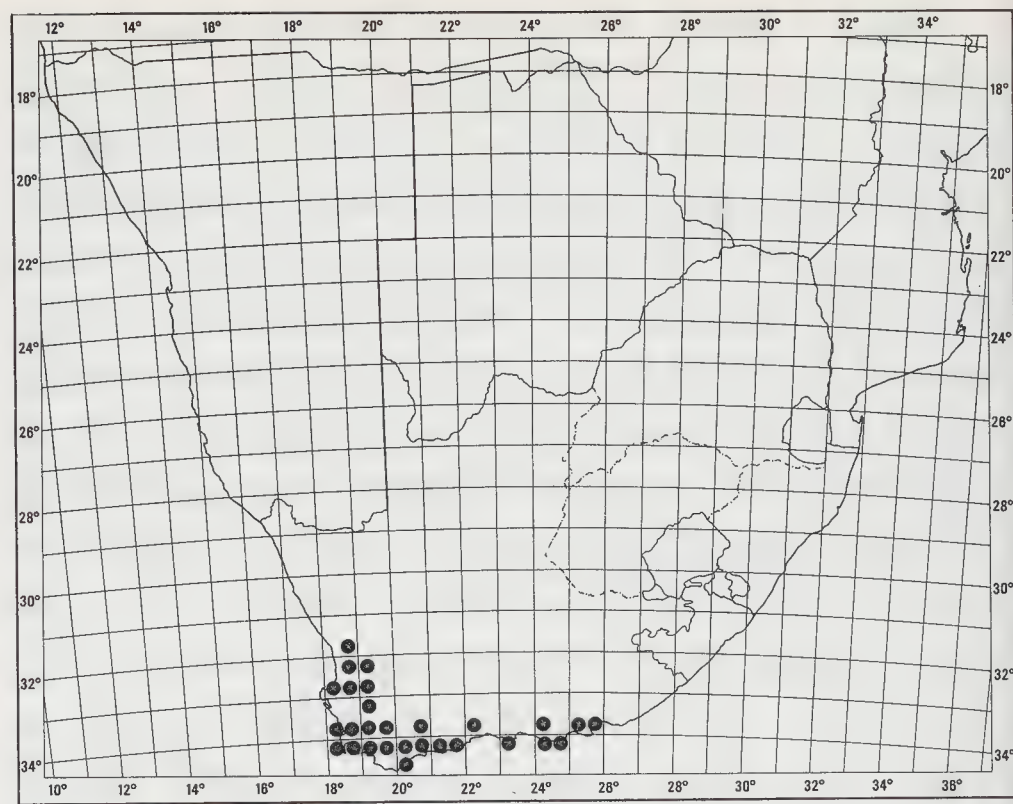
Asparagus nivenianus Schult.: 331, 1674 (1827). *Asparagopsis niveniana* (Schult.) Kunth: 88 (1850). Type: Cape Province, without precise locality, *Niven* (not located). *Ecklon 95b* (Herb. Cap. union, itin.) was identified as this species by Kunth (1850), and was also seen by Jessop (1966).

Asparagopsis dregei Kunth: 84 (1850). Type: Cape Province, Cape of Good Hope (Table Mountain and Devil's Mountain), *Drège s.n.* (K, iso.?, PRE, photo!).

Asparagus albus auct. non L. (1753): Thunb.: 66 (1794).

Asparagus capensis auct. non L. (1753): Marloth: t. 20 C (1915).

Erect, dense shrublets up to 1 m high, glabrous. *Rhizome* woody with long, cylindrical, woody roots. *Stems* rigid, spreading, smooth, shiny dark brown (yellow to green when young).



MAP 19.—*Protasparagus rubicundus*

Spines present below axils of branches and branchlets, patent-recurved, hard, sharp, up to 8 mm long. *Branches* closely beset with short, spineless branchlets bearing cladode fascicles and flowers. *Cladodes* ± 10 in each fascicle, terete, $\pm 7-10$ mm long (thin and longer in shade), subtended by fimbriate membranous bracts; rarely a minute spine may also be present. *Flowers* solitary or rarely paired beside each cladode fascicle; tepals obovate, $\pm 2-3$ mm long, white; stalks ± 5 mm long, articulated below. *Stamens* with red or brownish anthers. *Berry* with a single seed, pendulous, globose, ± 9 mm in diameter, apiculate, red.

Recorded from south-western Cape, east as far as Uitenhage and north as far as Piketberg; usually in more moist areas, 'common on flats and hillsides' (Salter: 175 (1950)). Flowering mainly March to June, but also at other times. Map 19.

This was the first Cape species of *Protasparagus* to be illustrated: in *Simon van der Stel's Journey to Namaqualand*: t. 817 (1685).

Vouchers: Bos 88; Fourcade 2195; Marloth 7723; Marloth 9492; Muir 931; Pillans 2942; Schlechter 7887.

25. *Protasparagus mucronatus* (Jessop) Oberm., comb. nov. Type: Cape Province, Middelburg district, Grootfontein, *Theron 551* (PRE, holo!).

Asparagus mucronatus Jessop: 56 (1966).

Erect, xerophytic, spiny, greyish shrubs ± 1 m high. *Rhizome* bearing numerous long, cylin-

drical, thick roots. *Stems* erect, the young spears covered with erect, appressed, linear-attenuated scale leaves, $\pm 20-60$ mm long; mature stems glabrous, branches and branchlets pubescent. *Spines* short, sharply recurved, ± 5 mm long, absent below cladode fascicles. *Cladodes* ± 4 in a fascicle (often a few fascicles approximated), filiform, ± 5 mm long, somewhat curved, apex with a long mucro, base discoid, pale, placed on a raised, bulbous, pale, permanent receptacle; the fascicle subtended by a membranous scale leaf. *Flowers* ± 2 in each cladode fascicle; tepals ± 4 mm long; stalks ± 8 mm long, articulated near base. *Stamens* with yellow anthers. *Ovary* with ± 6 ovules in each locule, oblong-ovoid, style short. *Berry* ± 5 mm in diameter, red.

Recorded from Cathcart to Montagu, Worcester and Kimberley; from dry karroid regions in the Cape, fairly common in some areas. Flowers recorded October to December with berries in May. Map 20.

A species with some unusual characters, such as the many membranous, long, erect scale leaves present on the young shoot. These may be up to 25–60 mm long; those present in the axils of branches are also long-attenuate and here moreover a second shorter pair may develop above the first. The persistent, pale-rimmed, circular base of the cladode fascicle is also present, as in *P. stellatus* (no. 58) and *P. microrhaphis* (no. 57).

Vouchers: *Acocks* 2580; *Bayer* 3284; *Dahlstrand* 2990; *Denman* 282; *Jessop* 637; *Jessop* 661; *Mauve & Hugo* 208; *Mauve & Hugo* 254; *Thompson* 3157.

26. *Protasparagus retrofractus* (L.) Oberm. in South African Journal of Botany 2: 244 (1983). Type: without locality or collector (LINN No. 434.4, holo.; NBG!, PRE, photo!).

Asparagus retrofractus L.: 313 (1753); *Bresler*: 10 (1826); *Roem. & Schult.*: 330 (1829); *Bak.*: 621 (1875); *Bak.*: 266 (1896); *Salter*: 167 (1940); *Jessop*: 58 (1966). *Asparagopsis retrofracta* (L.) Kunth: 88 (1850).

Asparagus africanus Lam. var. *microphyllus* Bak.: 266 (1896). *A. microphyllus* (Bak.) Kies: 178 (1951b). Type: Kuruman, Kosi Fontein, *Burchell* 2572 (K, holo.; PRE, photo!).

A. namaensis Schinz: 44 (1896). Type: Namibia, Great Namaqualand, without precise locality, *Fleck* 307a (Z, holo.; PRE, photo!).

Scrambler up to ± 3 m high, or forming tangled shrubs, bearing dense terminal fascicles of bunched cladodes. *Rhizome* typical; roots

fusiform when young, cylindrical, ± 12 mm in diameter and becoming hard with age. *Stems* hard, with strong bare internodes; nodes usually swollen, bearing primary and, later, secondary branches. *Spines* basal, short, recurved, reduced or absent above. *Branches* grey, with ciliate ribbing when young, zigzagging and bearing contracted, reflexed branchlets. *Cladodes* in dense, terminal, feathery clusters, filiform, $\pm 10-30$ mm long, curved, pale to bright yellow-green. *Flowers* 2–7-nate, inside cladode fascicles; tepals broadly linear, ± 3 mm long, inner somewhat wider than outer, white; stalks 5–40 mm long, articulated in lower half. *Stamens* with orange anthers. *Ovary* ovoid, attenuated into a short style; stigma 3-lobed. *Berry* ± 7 mm in diameter, orange or pinkish red.

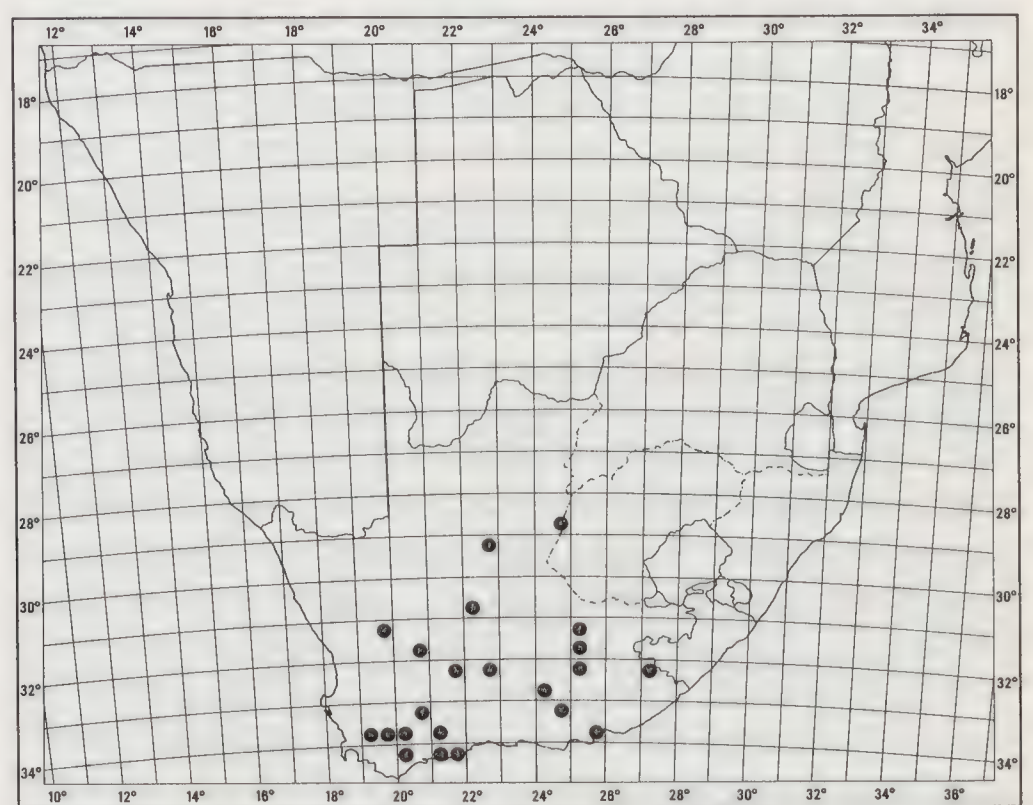
Recorded from Namibia south of Windhoek, and from most of the Cape Province, but not from Transkei; in sandy or rocky areas. Map 21.

Vouchers: *Acocks* 1741; *Bayer* 3344; *Bos* 149; *Ecklon & Zeyher* 20; *Mogg* 8976; *Taylor* 8574.

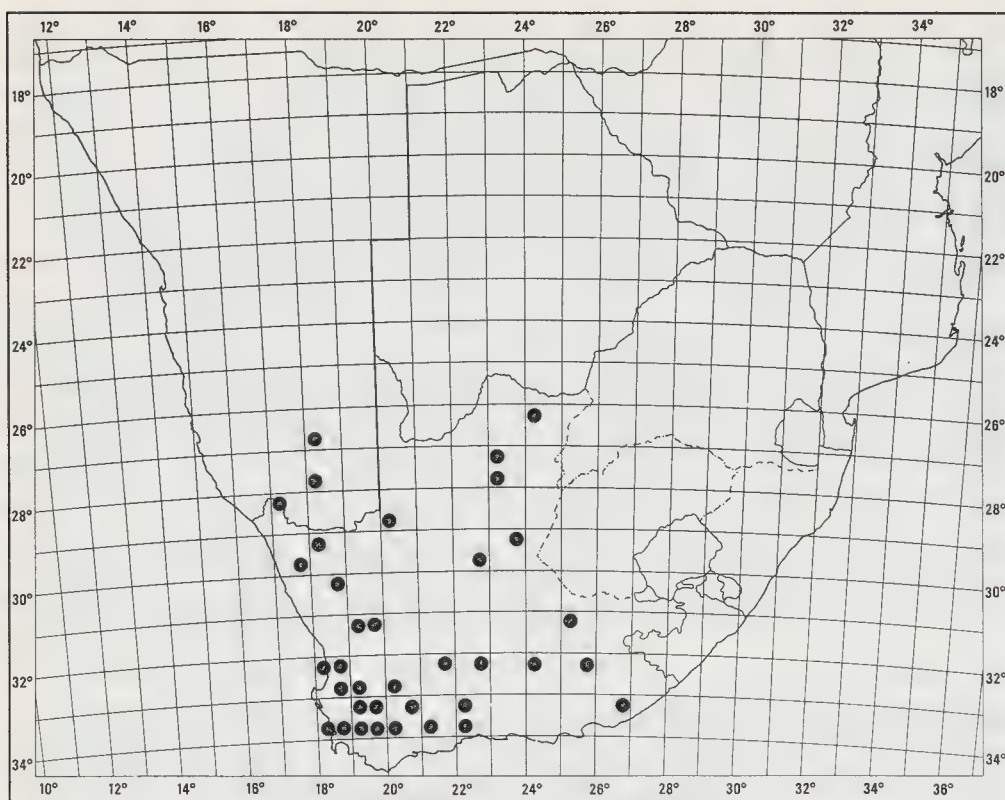
27. *Protasparagus multiflorus* (Bak.) Oberm. in South African Journal of Botany 2: 243 (1983). Type: Cape Province, Somerset Division, *Bowker* s.n. (K, holo.; PRE, photo!).

Asparagus multiflorus Bak.: 610 (1875); *Bak.*: 261 (1896); *Kies*: 177 (1951b).

A. africanus var. *pubescens* Bak.: 619 (1875). Syntypes: localities not given: *Cooper* 414; *Ecklon Smilac.* 15; *Ecklon & Zeyher* 236; *Zeyher* 4158.



MAP 20.—*Protasparagus mucronatus*

MAP 21.—*Protasparagus retrofractus*

A. dependens auct. non Thunb.: Eckl.: 363 (1830).

Coarse innocuous perennials, climbers or, if in the open, forming very large tangled shrubs, more or less evergreen. *Rhizome* hard, large; roots cylindrical. *Stems* coarse, hard, somewhat zigzagging, velvety-pubescent, minutely striate, pale green; nodes swollen, the spine forming a blunt triangular knob. *Branches* bearing short retrorse branchlets. *Cladodes* ± 7 per fascicle, terete, (5–)10–12 mm long. *Flowers* inside cladode fascicles on short reduced branchlets; tepals ± 3 mm long, white; stalks ± 4 mm long, articulated in lower half. *Stamens* with the filaments slightly swollen. *Ovary* with ± 6 ovules per locule; obovoid, papillate, dark. *Berry* not seen.

Recorded disjunctly from south-western and south-eastern Cape, both coastal and further inland; common, often forming large shrubs; flowering December to January. Map 22.

This species has been used as a vegetable in the south-eastern Cape. 'The bush is chopped down towards the end of winter. When the thick young shoots appear in spring, they are cut in lengths of $\pm 0,15$ m and boiled in salted water. They can be eaten as a vegetable with or without a cheese sauce. The taste is quite unlike the cultivated asparagus, more like a green vegetable, with a slight nutty flavour': Mr T. Hoole, farm Slaaikraal near Grahamstown. Ecklon, however, under *Asparagus dependens* sensu Ecklon (non Thunberg): 363 (1830), writes the following—'The young shoots of *A. dependens* are large and more agreeable to the taste than the cultivated *Asparagus*'.

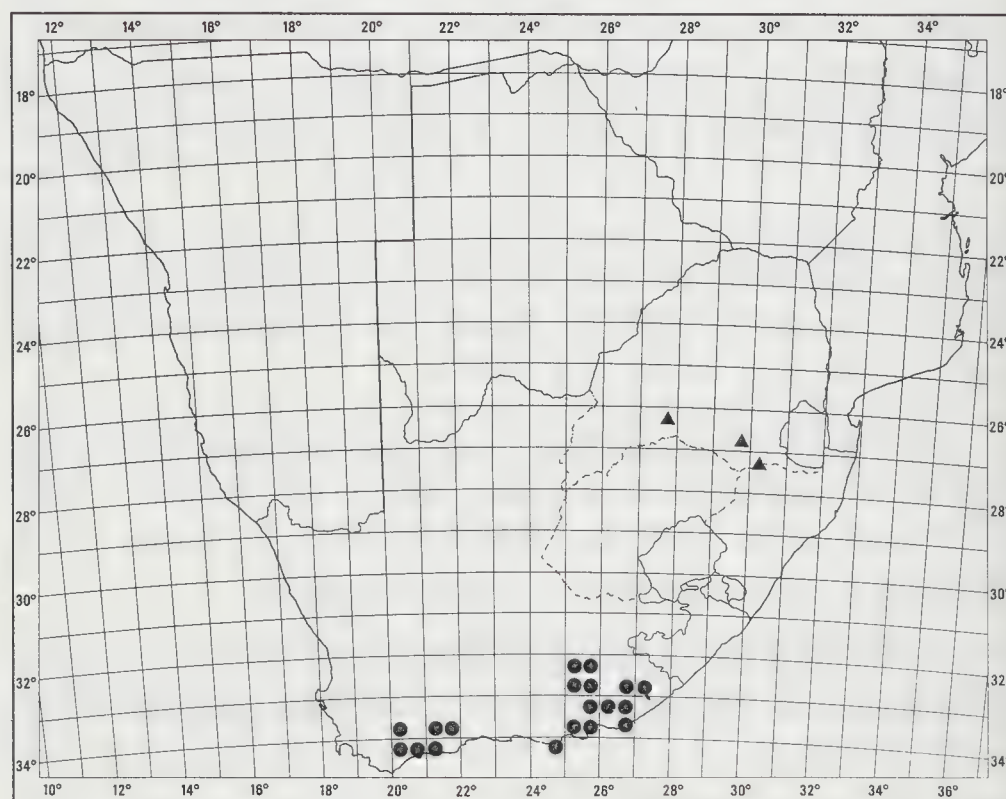
Vouchers: Hall-Martin 5734; Hoole s.n.; Mauve 5430; Zeyher 236; Zeyher 4158.

28. *Protasparagus fractiflexus* Oberm., sp. nov. a *P. cooperi* caulibus *fractiflexis squamis membranaceis spinas fingentibus differt.*

Planta scandens (chamaephytum?) lignosa glabra ad 1 m alta caulibus ramisque valde fractiflexis. Rhizoma et radices non vidi. Caulis gracilis laevis. Spinae absentes, folia squamoides membranacea rubrobrunnea attenuata. Rami inter fasciculos cladodiorum fractiflexi, ramulos perbreves ferentes in fasciculum cladodiorum apicalem solitarium terminantes. Flores 1–3, parvi, e fasciculo apicali cladodiorum exserti; tepala oblonga, 2–3 mm longa, alba; pedicellus 4 mm longus, infra medium articulatus. Stamina filamentis latis antheris flavis. Ovarium obovoideum, ovulis in quoque loculo ± 4 , furvum; stylo stigmatibusque brevibus. Baccam non vidi.

Type: Transvaal, 2730 (Vryheid): (–AD), farm Oshoek (Wakkerstroom district), Tölken 1116 (PRE, holo.).

A woody, glabrous scrambler up to 1 m high with the stems and branches slightly to strongly zigzagging (chamaephyte?). *Rhizome* and roots not seen. Stem slender, smooth. *Spines* absent, the scale leaves membranous, reddish brown, attenuate. *Branches* zigzagging between cladode fascicles and giving off very short branchlets which end in a solitary apical cladode fascicle, sessile in younger upper part. *Cladodes* 2–6 (–10) mm long. *Flowers* 1–3, small, exserted



MAP 22.—● *Protasparagus multiflorus*
▲ *P. fractiflexus*

from the apical cladode fascicle; tepals oblong, 2–3 mm long, white; stalk 4 mm long, articulated in lower half. *Stamens* with broad filaments and yellow anthers. *Ovary* with ± 4 ovules in each locule; obovoid, dark; style and stigmas short. *Berry* not seen.

Known only from three collections in southern Transvaal; from rocky montane areas; said to be common where found. Map 22.

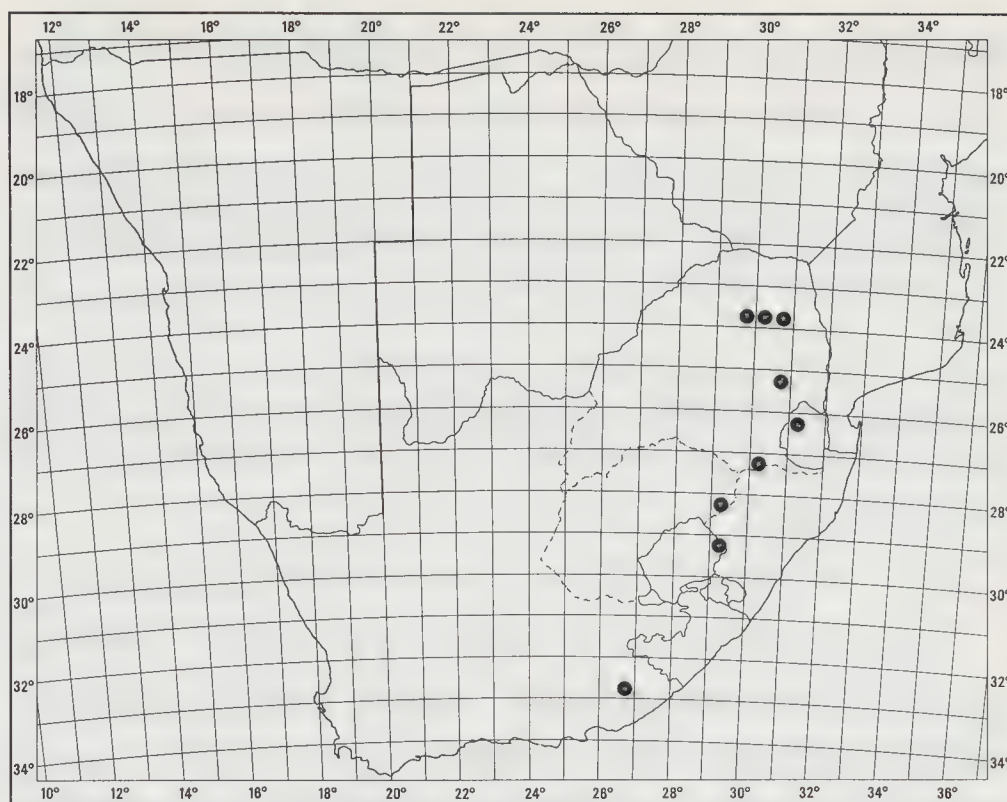
Vouchers: *Pupils of the Convent 77*; *Tölken 1116*.

29. *Protasparagus edulis* Oberm., sp. nov.
P. devenishii Oberm. *affinis sed glabra, axillis nudis*.

Chamaephytum annuum caule uno vel caulibus paucis, primo erectis, demum elongantibus scandentibus, gracilibus glaucis. Rhizoma typicum, radicibus cylindraceis. Spinae ad basin caulis, ad 10 mm longae, reflexae fragiles, supra basin caulis minutae vel absentes. Rami ad angulum 90° patentes, apicibus juvenibus saepe vere cernuis, axillis nudis (sine fasciculis cladodiorum). Ramuli ad angulum 90° patentes, primo brevi planta florenti, demum elongescentes ad 40–60 mm, saepe ramificantes, fasciculis cladodiorum imbricatis. Cladodia parva, variabilia longitudine, ± 5 mm longa, apiculata mollia. Flores 1–4, exserti saepe apicales, inter fasciculos cladodiorum; tepala ± 3 mm longa, alba; pedicellus fructu ± 4 mm longus. Stamina tepalis valde breviora, filamentis latis planis. Ovarium obovoideum, infra attenuatum, furvum, stylo stigmatibusque brevibus, ovulis in quoque loculo 4. Bacca ± 5 mm diametro.

Type: Transvaal, 2330 (Tzaneen): (–CA), Westfalia Estate, *Scheepers 1028* (PRE, holo.; MO, iso.).

Stems one to few, annual (chamaephyte), erect at first, lengthening and scrambling with age, glabrous, slender. *Rhizome* typical; roots cylindrical. *Spines* present at base of stem, reflexed, up to 10 mm long, brittle, minute or absent above. *Branches* at right angles to stem, often with the young tips drooping in spring, the axils bare (without cladode fascicles); branchlets at right angles to branches, short at first when flowering, lengthening to ± 40 –60 mm and often



MAP 23.—*Protasparagus edulis*

branching; the cladode fascicles overlapping. *Cladodes* small, variable in length, ± 5 mm long, apiculate, soft. *Flowers* 1–4, exserted, and often apical, amongst cladode fascicles, tepals ± 3 mm long, white; stalk ± 4 mm long in fruit. *Stamens* much shorter than tepals; filaments wide and flat. *Ovary* with 4 ovules in each locule; obovoid, attenuate below, dark; style and stigmas short. *Berry* ± 5 mm in diameter.

Recorded from the more humid areas of northern, eastern and southern Transvaal, Swaziland, eastern O.F.S. and eastern Cape; also collected in eastern Zimbabwe; open grassveld or in shade in scrub. Map 23.

Mrs M. Jacobsz from Harrismith recorded that the young shoots were eaten by both the white and the black community.

Vouchers: *Compton 30974*; *Dahlstrand 2702*; *Devenish 1849*; *Kluge 616*; *Mogg 20511*; *Pott Leendertz 4690*.

30. *Protasparagus devenishii* Oberm., sp. nov. *P. eduli affinis sed pubescens et grossior*.

Suffrutex robustus ± 0.6 –1.0 m altus, dumeta faciens. Rhizoma typicum lignosum radicibus teretibus longis. Caules plures implicantis lignosi multiramosi. Spinae reflexae ± 5 mm longae, solum secus nodos caulis. Rami satis longi, ramulos numerosos breves minute pubescentes facientes qui fasciculos densos cladodiorum crebros vel imbricatos ferentes. Cladodia filiformia ad anthesin ± 3 mm longa, demum ad ± 8 mm elongescentia. Flores multi, intra fasciculos

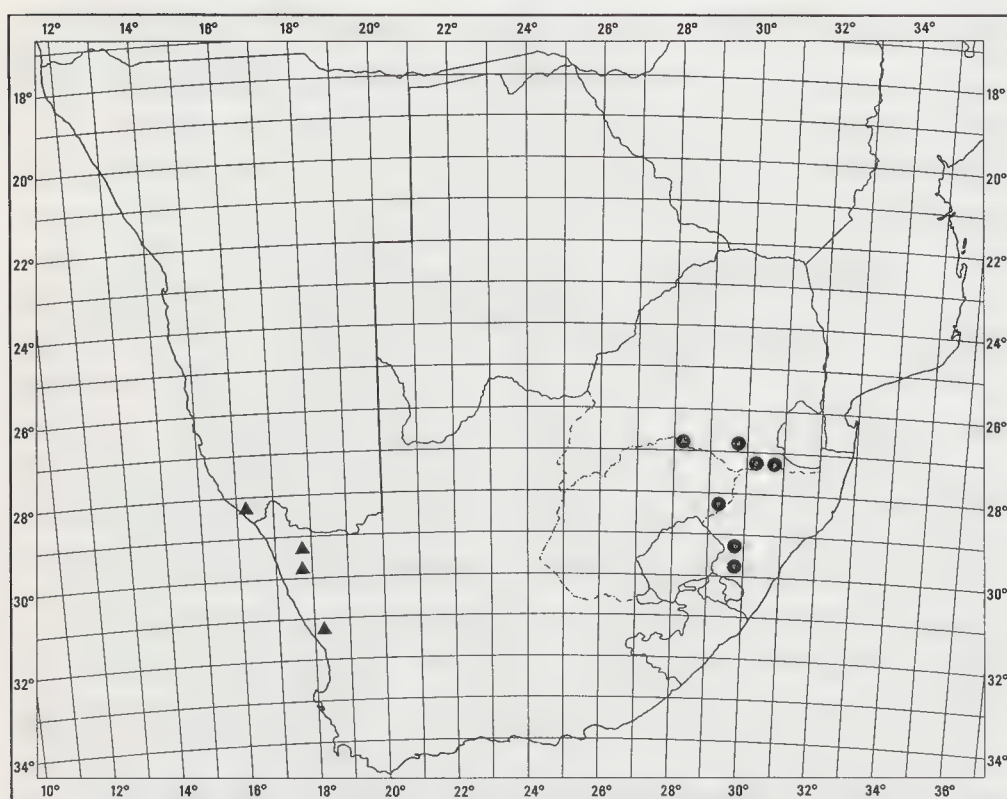
cladodiorum; *tepala anguste oblonga*, ± 4 mm *longa*, *alba*; *pedicellus* ± 4 mm *longus*, *infra medium articulatus*. *Stamina antheris flavis*. *Ovarium anguste obovoideum furvum*, *ovulis 6*, *stylo breve*. *Bacca rubra*.

Type: Transvaal, 2730 (Vryheid): (–AD), farm Oshoek (Wakkerstroom district), *Devenish 1156* (PRE, holo.).

Robust shrublet $\pm 0,6$ – $1,0$ m high, forming thickets. *Rhizome* typical, woody, with long terete roots. *Stems* several, intertwining, woody, much branched. *Spines* reflexed, ± 5 mm long, present only on stem nodes. *Branches* fairly long, producing numerous short, minutely pubescent branchlets bearing thick cladode fascicles placed close together to overlapping. *Cladodes* filiform, ± 3 mm long at anthesis, lengthening to ± 8 mm. *Flowers* numerous inside cladode fascicle; tepals narrowly oblong, ± 4 mm long, white; stalk ± 4 mm long, articulated in lower half. *Stamens* with yellow anthers. *Ovary* with 6 ovules; dark, narrowly obovoid; style short. *Berry* red.

Recorded from south-eastern Transvaal, eastern O.F.S. and western Natal; montane, rocky areas; fairly common. Map 24.

Vouchers: *Acocks 10626*; *Bredenkamp 848*; *Devenish 97*; *Jessop 664*; *Mogg 18129*; *Van der Zeyde 129*.



MAP 24. — ● *Protasparagus devenishii*
▲ *P. graniticus*

31. *Protasparagus graniticus* Oberm., sp. nov. a *P. exuviali spinis multis bene evolutis* differt.

Frutices erecti spinosissimi ± 1 m *alti*. *Rhizoma compactum*. *Radices multi longi*, *prope rhizoma tumidi*, *infra gradatim attenuati*, *pelle molli spongiosa*. *Caules multi*, *juvenes cernui*, *durescentes*, *pelle exteriori grisea subaspera in forma laciniarum albarum membranacearum exuviente*, *corticem brunneum inferiorem pateficiente*; *internodiis perbrevibus*, *fractiflexis*. *Spinae exsertae*, *acres*, *10–15 mm longae*, *subter ramis*, *ramulis et fasciculis cladodiorum positae*. *Ramuli quam rami valde tenuiores et breviores*, *patentes luteoli dense spinis fasciculisque cladodiorum muniti*. *Cladodia permulti in quoque fasciculo*, *filiformia*, ± 15 mm *longa*, *griseola*. *Pedicelli 2 ad nodum*, *divaricati*. *Flores non vidi*. *Bacca* ± 5 mm *diametro*, *viridis* (*fide Bayer 3333b*).

Type: Cape, 2917 (Springbok): (–BD), Rietberg Mine, north of O’Kiep, granite slopes, *Bayer 3333b* (PRE, holo.).

Erect, very spiny, greyish shrubs ± 1 m high. *Rhizome* compact. *Roots* numerous, long, swollen near rhizome, gradually attenuate below, skin soft, spongy. *Stems* numerous, drooping when young, becoming hard, the grey, somewhat rough outer skin exuviating as white membranous strips, exposing the smooth bark underneath; internodes very short, zigzagging. *Spines* exserted, sharp, 10 – 15 mm long, present below branches, branchlets and cladode fascicles. *Branchlets* much thinner and shorter than branches, spreading, yellowish, closely beset with spines and cladode fascicles. *Cladodes* very many in a fascicle, deciduous, filiform, ± 15 mm long, greyish. *Flower stalks 2* at a node, divaricate. *Flowers* not seen. *Berry* ± 5 mm in diameter, green (*fide Bayer 3333b*).

Recorded from a few localities to the north and south of Springbok, with one record from the Sperrgebiet in Namibia; granite slopes and sandy flats, also in gullies; locally common. Map 24.

Vouchers: *Bayer 3841*; *Mauve & Forrester 5439*.

32. *Protasparagus exuvialis* (Burch.) Oberm. in *South African Journal of Botany* 2:

244 (1983). Type: Cape Province, along the Vaal River, Griqualand West, *Burchell 1768* (K, holo.; PRE, photo!).

Erect or scrambling, glabrous shrubs $\pm 1-2$ m high, with short, strongly zigzagging internodes (or upper branches straight in forma *ecklonii*), the skin peeling off as white membranes. *Rhizome* typical, bearing numerous roots with fusiform swellings (Figure 9) up to 0,2 m long in upper part, cylindrical below. *Stems*, branches and branchlets with short, divaricate internodes in forma *exuvialis*, or with the upper flowering branches long, straight and supple in forma *ecklonii*. *Spines* minute or absent. *Cladodes* deciduous, absent or immature at anthesis, filiform, lengthening with age, up to 30 mm long and in time multiplying in each fascicle. *Flowers* 2, divergent, placed at nodes on outside of immature cladode fascicle, in forma *ecklonii* 2-6-nate, with the long, young, upper branches and branchlets appearing racemose, tepals narrowly oblong, ± 4 mm long, yellow or white, opening in the morning, closing early; stalk 3-6 mm long, articulated near middle. *Ovary* with 4 ovules in each locule; ovoid. *Berry* red or orange, ± 10 mm in diameter.

Widespread in the drier parts of South Africa, Botswana and Namibia, but not so far recorded from Swaziland, Natal or Lesotho; usually in sandy areas.

Two forms are recognized:

Branches and branchlets widely zigzagging with short internodes; flowers 2 at each node, divaricate; stalk 2-3 mm long; bracts broad, short

..... 32a. forma *exuvialis*

Branches and branchlets straight or nearly so; flowers 2-4(-6) at each node; stalk ± 1 mm long; bracts acute, irregularly dentate

..... 32b. forma *ecklonii*

32a. forma *exuvialis*.

Asparagus exuvialis Burch.: 432 (1822); Bresler: 40 (1826); Roem. & Schult.: 337 (1829); Kunth: 74 (1850); Bak.: 608 (1875); Bak.: 259 (1896); Schinz: 42 (1896); Salter: 175 (1950); Sölch *et al.*: 30 (1966); Jessop: 62 (1966). Type: Cape Province, along the Vaal River, Griqualand West, *Burchell 1768* (K, holo.; PRE, photo!).

A. hereroensis Schinz: 43 (1896). Syntypes: Namibia, Rehoboth, *Fleck 295a* (Z!); Harris, *Fleck 549* (Z).

Stems, branches and branchlets strongly zigzagging. The two flowers divergent, placed at the

nodes on the outside of the immature cladode fascicle.

Recorded from most of the Cape, from O.F.S., Transvaal, eastern Botswana and Namibia; usually in sandy areas and on surface limestone. Map 25.

Vouchers: *Acocks 1465*; *Bayer 3277*; *Bolus 13201*; *Giess, Watt & Snyman 11059*; *Herman 253*; *Story 5177*; *Verdoorn 932*.

32b. forma *ecklonii* (Bak.) Oberm., comb. et stat. nov.

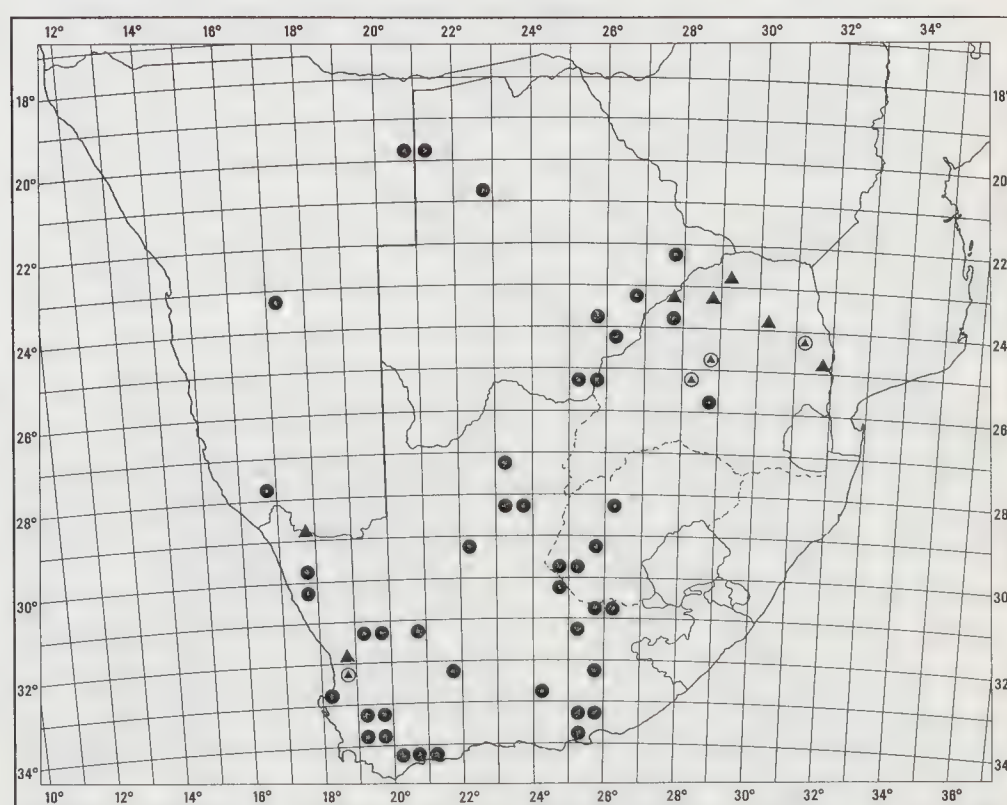
Asparagus ecklonii Bak.: 615 (1875); Bak.: 258 (1896). Type: Cap. bon. spei, *Ecklon & Zeyher s.n.* (marked '*A. stipularis* ?') (TCD; photo. in PRE!).

Similar to forma *exuvialis* but with the young upper branches and branchlets straight, or laxly curved, appearing racemose with the 2-4-flowered fascicles closely arranged at regular, short intervals.

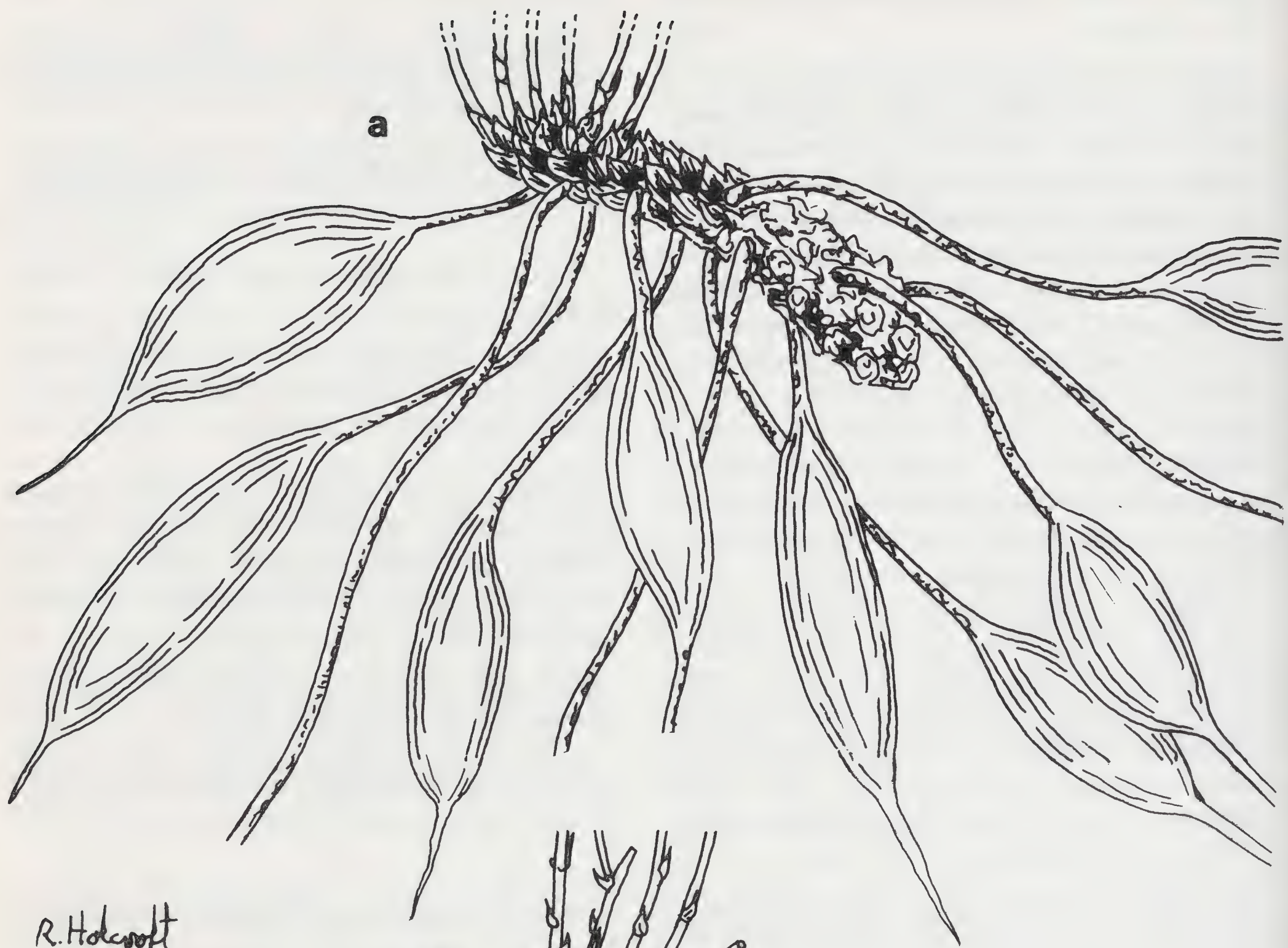
Apparently more common in northern and north-eastern Transvaal than the typical form. Map 25.

Vouchers: *Codd 6197*; *Huntley 1420*; *Obermeyer, Schweick-erdt & Verdoorn 51*; *Obermeyer, Schweick-erdt & Verdoorn 97*; *Smook 4263*; *Zambatis 376*; *Zwanziger 117*.

33. *Protasparagus falcatus* (L.) Oberm. in South African Journal of Botany 2: 244 (1983). Iconotype: *Burman*, Thesaurus Zeylanicus t. 13, f. 2 (1737).



MAP 25. — ● and ▲ *Protasparagus exuvialis* forma *exuvialis*
▲ and ▲ *P. exuvialis* forma *ecklonii*



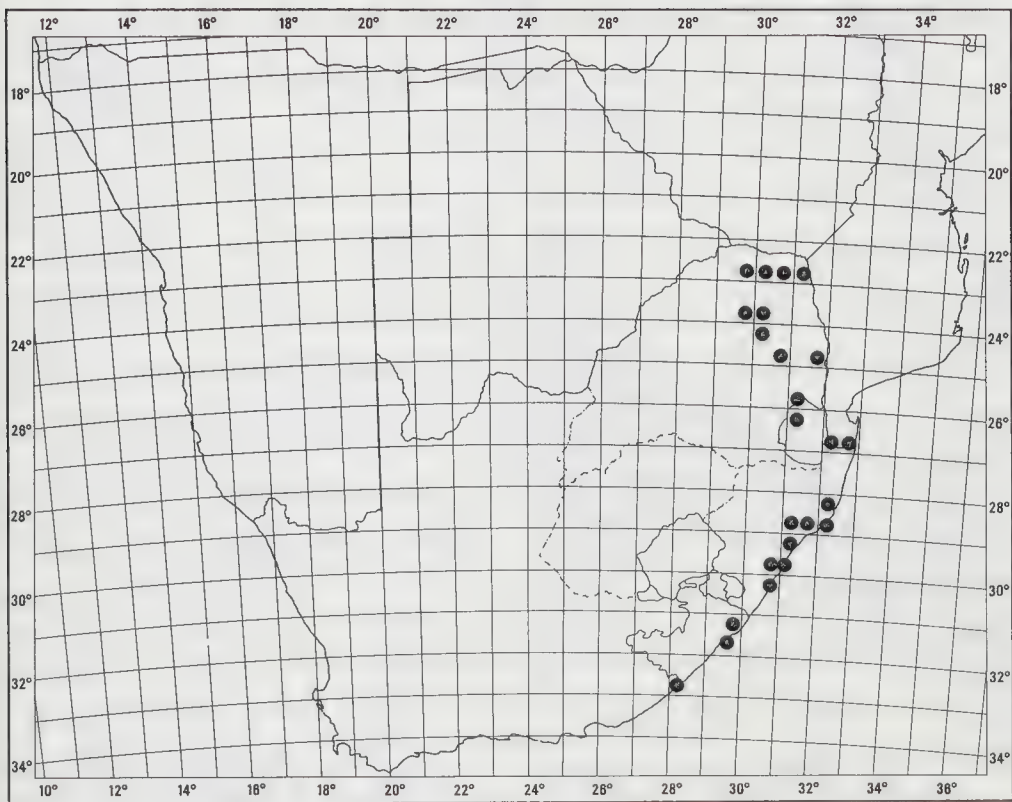
R. Holcroft



Asparagus falcatus L.: 313 (1753); Bresler: 2 (1826); Kunth: 71 (1850); Bak.: 626 (1875); Bak.: 271 (1896); Jessop: 69 (1966).

Tall climbers. *Rhizome* woody, broad; main roots swollen when young, fusiform, lengthening with age and becoming cylindrical and hard, ± 15 mm in diameter. *Stems* smooth, usually pale. *Spines* short, recurved. *Cladodes* linear, $\pm (30-)$ 60(–110) \times 3–5 mm, straight or falcate, smooth, with a distinct midrib. *Racemes* simple, 1–3, axillary, $\pm 30-60$ mm long, present on main stems and branches, but often compound and present in great profusion; bracts ovate-acuminate, membranous. *Flowers* with tepals obovate, 3 mm long, white; stalks ± 7 mm long, articulated below middle, articulation forming a wide frilly disc. *Stamens* with flattened filaments. *Ovary* with ± 6 ovules in each locule; dark, obovoid, attenuate at the base; style short with 3 short swollen stigmas. *Berry* globose or somewhat flattened, 2- or 3-grooved, red, 1–3-seeded; seed ± 6 mm in diameter.

Widespread in warmer parts of southern Africa, from Transvaal, Natal and Transkei; also from tropical East Africa to India. Originally described from Ceylon (Sri Lanka). Growing in moist situations, usually on margins of forest and bush clumps. Map 26.



MAP 26.—*Protasparagus falcatus*

Vouchers: Compton 28020; Forbes 369; Netshiungani 775; Pegler 1335; Van der Schijff 572.

34. *Protasparagus buchananii* (Bak.) Oberm. in South African Journal of Botany 2: 243 (1983). Type: Nyasaland (Malawi), Shire Highlands, *Buchanan* 1503 (K, lecto.!; PRE, photo.!); *Buchanan* 757.

Asparagus buchananii Bak.: 211 (1893); Bak.: 434 (1898); Jessop: 67 (1966).

Tall, glabrous, densely branched, woody climbers. *Rhizome* compact, woody, bearing numerous roots swollen above. *Stems* several, up to ± 3 m long and up to ± 15 mm in diameter at base, shiny yellowish brown. *Spines* on stems straight, reflexed, flattened, $\pm 30-60$ mm long, those on branches progressively smaller, absent from branchlets. *Cladodes* on short branchlets in fascicles of 2–6, unequal in length, filiform, up to $\pm 12-30$ mm long, usually absent at anthesis. *Flowers* in simple or compound racemes, tepals white, ± 2 mm long, reflexed, flower base elongate (pericladium), lengthening with age to 1 mm long; bract enveloping stalk, inflated at the base, membranous, dentate, acuminate; stalk articulated at apex, ± 3 mm long. *Stamens* with flattened filaments, anthers yellow or dark. *Ovary* with ± 4 ovules in each locule; dark, narrowed below, obtuse above; style short, with 3 short obtuse stigmas. *Berry* shortly stipitate, usually 3-seeded, tepals persisting at base. Figure 10.

Recorded from northern Namibia, eastern Botswana, Transvaal, Swaziland and Natal; to eastern subtropical Africa; in bushveld. Map 27.

Vouchers: De Winter & Giess 7054; Jessop 670; Schweickert 1019; Strey 9829.

35. *Protasparagus racemosus* (Willd.) Oberm. in South African Journal of Botany 2: 244 (1983). Type: India, in herb. Willdenow (B, holo.; PRE, photo.).

Asparagus racemosus Willd.: 152 (1799); Wight: t. 2056 (1853); Bak.: 623 (1875); Engl.: 169 (1892); Bak.: 434 (1898).

FIGURE 9.—Root systems: a, *Protasparagus exuvialis* showing swollen main roots (after Toelken 292); b, *P. striatus* showing tuberous side roots (after Mauve & Hugo 203). Artist: R. Holcroft.

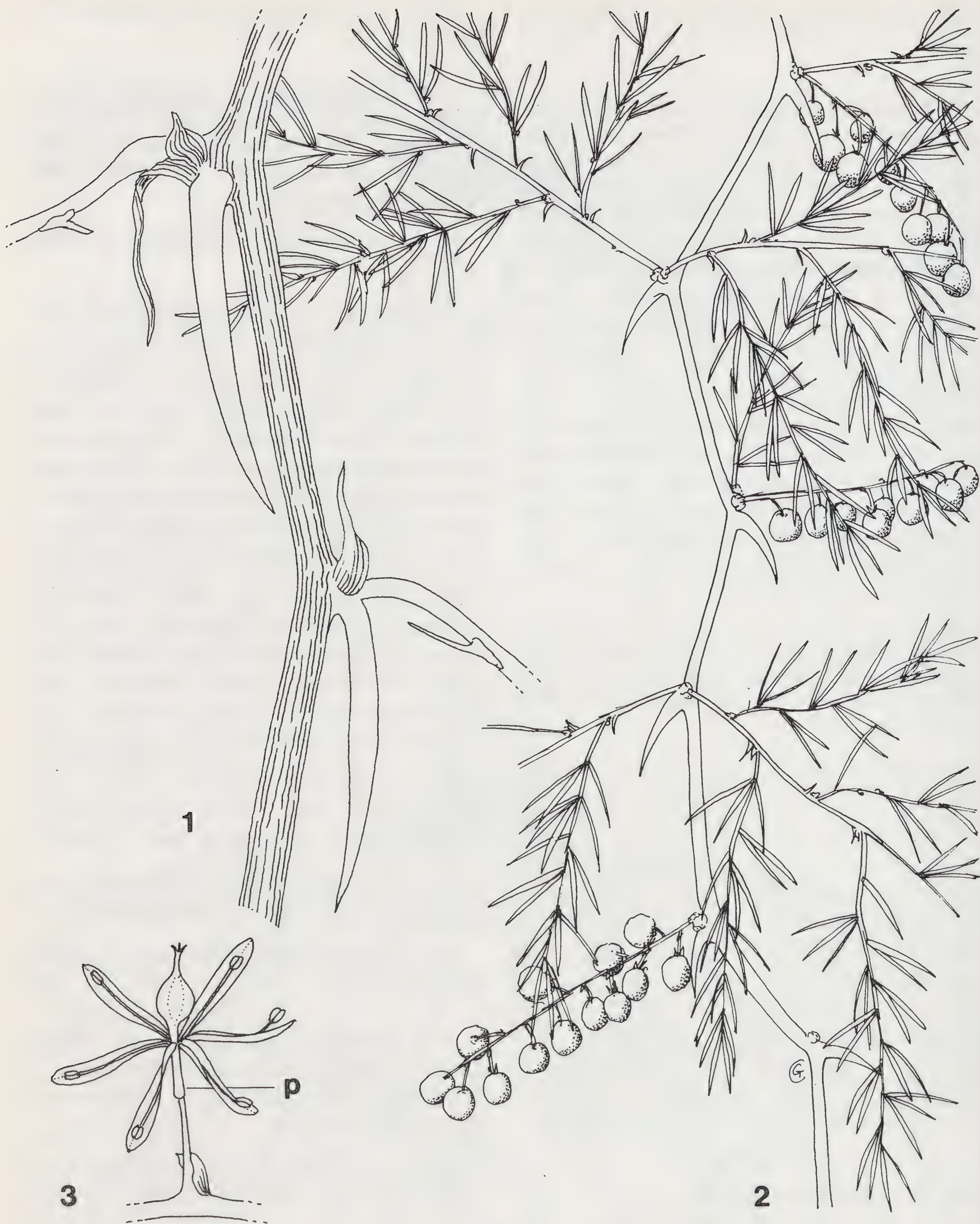
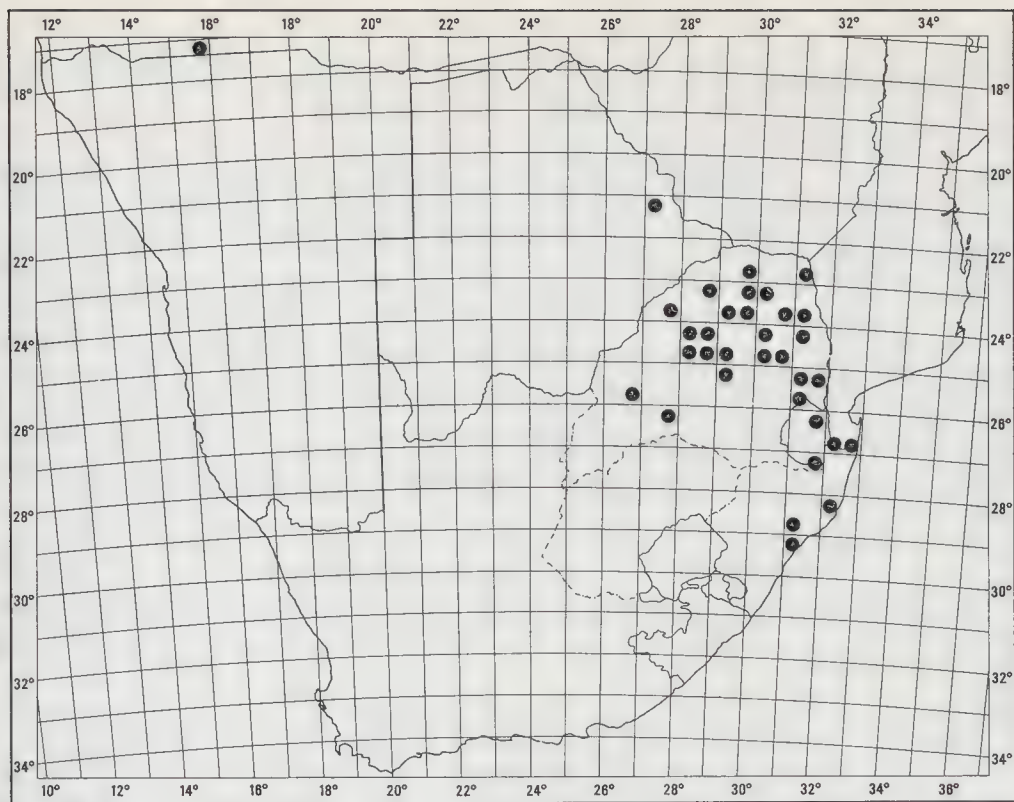


FIGURE 10. — *Protasparagus buechananii*: 1, basal part of stem showing recurved spines (modified leaves), $\times 1$ (after Rauh & Schlieben 9693); 2, young flowering branch, $\times 1$; 3, flower with pericladium (p) and stalked ovary, $\times 6$ (after Zambatis 1196). Artist: G. Condry.


 MAP 27.—*Protasparagus buchananii*

Asparagopsis floribunda Kunth: 98 (1850), nom. illegit. Type: as for *A. racemosus*.

Asparagus saundersiae Bak.: 42 (1889); Bak.: 269 (1896). Type: Natal, Mrs K. Saunders s.n. (K, holo.; PRE, photo!).

Tall climbers or, if without support, tangled shrubs with shiny yellow stems and soft, feathery branches when 'in leaf', usually bare when in flower. *Rhizome* woody, small, compact. *Roots* many, with fusiform swellings near rhizome. *Stems* straight, smooth. *Spines* short, recurved, present on stems and main branches. *Branches* spreading, bearing numerous branchlets, ± 70 mm long, closely beset with overlapping cladode fascicles. *Cladodes* $\pm 4-8$ per fascicle, unequally long, filiform, 10–16 mm long, thin. *Flowers* in simple racemes, in multibudded axils of stems and branches, usually several racemes together, racemes $\pm 20-30$ mm long; tepals attenuate below, ± 3 mm long, white with a reddish central streak, reflexed in fruit; bracts membranous, acuminate, curved around stalk below; stalk ± 2 mm long, articulated in middle. *Stamens* with red (or dark) anthers. *Ovary* attenuate below. *Berry* shortly stipitate, ± 7 mm in diameter, red.

Northern Namibia and Botswana, northern and central Transvaal, Swaziland, Natal and Transkei; widespread from India to tropical and subtropical eastern Africa; a thicket constituent in frost-free savanna with a fairly high rainfall. Map 28.

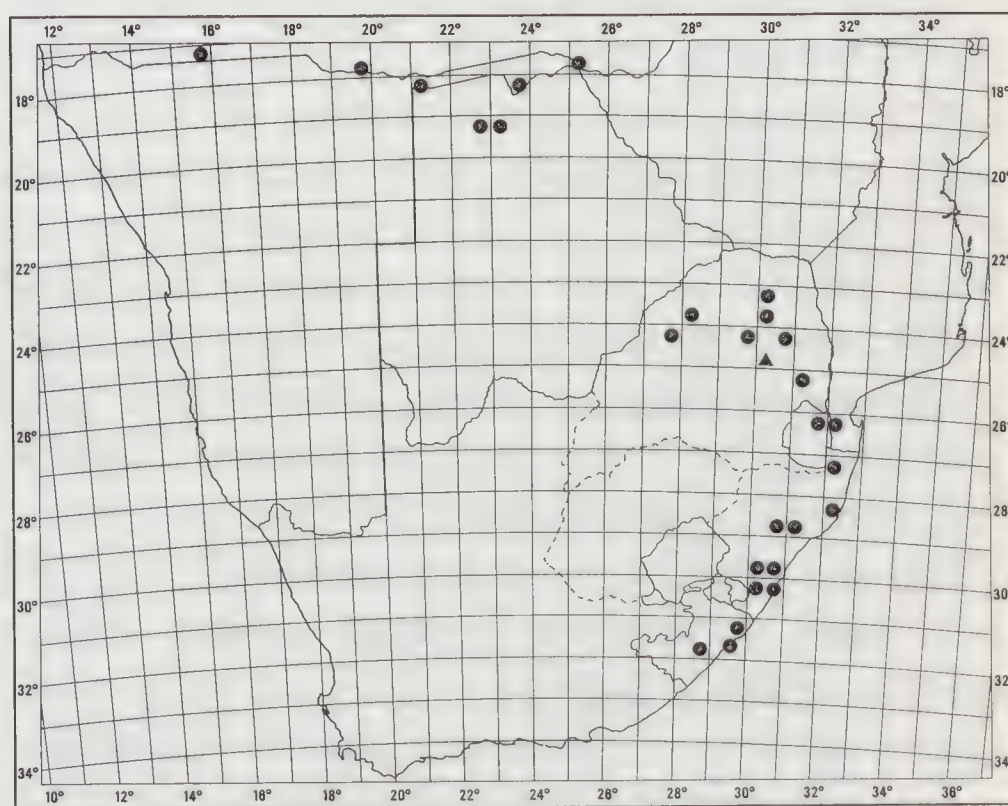
Vouchers: Culverwell 421; Deall 1825; De Winter 3776a; Giess 11460; Smith 609; Ward 4804.

36. *Protasparagus lynetteae* Oberm., sp. nov. *P. racemosus* (Willd.) Oberm. affinis sed caulibus puberulis et radicibus tumoribus grandioribus.

Planta perennis scandens, caulibus gracilibus puberulis ramis brevibus patentibus. Rhizoma compactum radicibus multis tumidis crebris patentibus, tumore unoquoque $\pm 0,2$ m longo, in extremis ambobus attenuato. Caules tenues ad 3 m longi, basin versus 5 mm diametro, flexibiles minute albopuberuli. Spinae tenues exsertae ± 4 mm longae. Rami breves, ad 0,1 m longi, exserti crebri. Cladodia in quoque fasciculo 10–12, spina breve subtenta, 3-angulata tenuia $\pm 10-15$ mm longa, curvata apiculata. Racemi discreti ex eodem nodo ut rami, sed longiores. Flores laxe dispersi in pedicellis persistentibus brevibus atque longioribus, interdum 2 vel 3 aggregati; perianthium (marcidum) ± 4 mm longum. Stamina antheris flavis. Gynoecium obovoideum, verosimiliter ovulis 4 in quoque loculo. Baccae globosae flavae, siccae verrucosae, ± 5 mm diametro.

Type: Transvaal, 2430 (Pilgrim's Rest): (–CB), near Burgersfort, in dense bushveld at Gethlane Lodge, Mauve, Reid & Smook 5408 (PRE, holo.).

Scandent perennial, with long, thin, puberulous stems, clambering over surrounding shrubs, with the branches short, spreading. *Rhizome*


 MAP 28.—● *Protasparagus racemosus*
▲ *P. lynetteae*

compact, with numerous swollen roots placed close together, spreading; each swelling $\pm 0,2$ m long, attenuate at both ends. *Stems* thin, supple, minutely white puberulous, up to ± 3 m long, 5 mm in diameter at base. *Spines* thin, exserted, ± 4 mm long. *Branches* exserted, placed close together, short, up to 0,1 m long. *Cladodes* in fascicles of 10–20, subtended by a short spine, 3-angled, thin, ± 10 –15 mm long, curved, apiculate. *Racemes* separate, from same node as branches but longer; flowers laxly dispersed on short and longer persistent stalks, occasionally in clusters of 2 or 3; perianth (faded) ± 4 mm long. *Stamens* with yellow anthers. *Gynoecium* obovoid, probably with 4 ovules in each locule. *Berries* globose, much wrinkled in dry state, ± 5 mm in diameter, yellow.

Occurs in eastern Transvaal; in bushveld. Map 28.

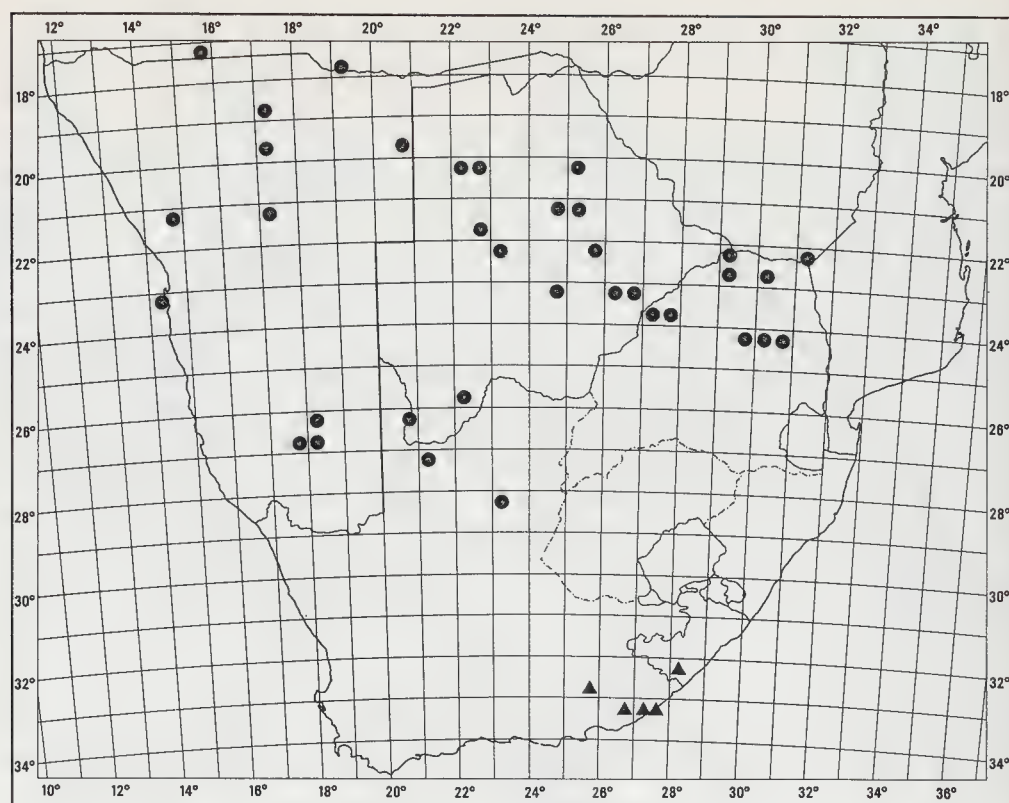
Named after Lynette Fish (née Smook), the first to collect this species and in appreciation for her unstinting support on many excursions.

Voucher: type only.

37. *Protasparagus nelsii* (Schinz) Oberm. in South African Journal of Botany 2: 244 (1983). Type: Namibia, 'Hereroland', Nels 70 (Z, holo.; PRE, photo.).

Asparagus nelsii Schinz: 44 (1896); Sölch *et al.*: 31 (1966); Jessop: 76 (1966).

Erect spiny shrubs up to ± 1 m high, with short, plumose branchlets in summer, bare in spring when flowering and fruiting. *Roots* numerous, very long and thick, with fusiform swellings up to 0,3 m long, near or further away from the hard, woody rhizome. *Stems* minutely pubescent or glabrous, grey with minute black speckles; nodes many-budded, swollen, below with a sharp recurved spine 5–10 mm long. *Branches* spreading, spinous, bearing short plumose branchlets. *Cladodes* filiform, 4–9 per fascicle, ± 10 –25 mm long, overlapping, greyish green, with a minute spine below each fascicle, deciduous, absent at anthesis. *Racemes* from the stem nodes, 1 to several, short, simple, rarely large and many-flowered; flowers 1–4 in a fascicle; tepals ± 5 mm long, white or pale cream; bracts spinous, minute; stalks short. *Stamens* with pale anthers.



MAP 29. — ● *Protasparagus nelsii*
▲ *P. oxyacanthus*

Ovary ellipsoid with ± 8 ovules per locule. *Berry* one-seeded, red.

Recorded from Namibia, Botswana, Transvaal and northern Cape; also present in Angola; from dry areas, sandy grassy flats, or along dry river beds. Map 29.

Berries eaten by korhaan (*fide* Bradfield 89). Used as a tea by Kwanyama: 'Leaves and twigs stamped and made into a tea; drunk for an upset stomach' (Rodin 9357).

Vouchers: Codd 10568; Giess, Watt & Snyman 11909; Giess 3706; Jensen 464; Leistner 2236; Liebenberg 8967; Mauve, Reid & Smook 5404; Smook 4288; Theron 2904.

38. *Protasparagus oxyacanthus* (Bak.) Oberm. in South African Journal of Botany 2: 244 (1983). Type: Cape Province, Somerset East, Bowker s.n. (K, holo.; PRE, photo.).

Asparagus oxyacanthus Bak.: 625 (1875); Bak.: 270 (1896).

Erect, woody shrubs up to ± 1 m high, virgate or branched. *Rhizome* woody; roots tuberous when young, lengthening with age, with an occasional tuber towards growing point. *Stems* erect, with short internodes, minutely pubescent. *Spines* short, reflexed, sharp. *Cladodes* solitary, overlapping, linear, $\pm (25\text{--})40\text{--}65 \times \pm 5$ mm, 1-nerved, apiculate, leathery, dark green, margin entire, thickened below. *Raceme* short, compact, ± 20 –70 mm long; flowers fascicled or solitary; bracts ovate-acuminate, 5 mm long,

membranous; tepals ovate, 3–4 mm long; stalks \pm 1 mm long, articulated below attenuate flower base. *Stamens* typical. *Ovary* with locules \pm 6-ovuled; globose; style short with 3 short stigmatic lobes. *Berry* not seen.

Confined to eastern Cape, from Bathurst to East London, reported to be fairly common on the slopes above the Fish River; on dry slopes, in scrub or on edge of forest. Flowering October to January. Map 29.

Cultivated as a ground cover at the Kirstenbosch National Botanical Garden.

Vouchers: *Acocks* 11885; *Dyer* 3375; *Medley Wood sub Galpin* 3147; *Smith* 3765; *Story* 4531.

39. *Protasparagus densiflorus* (Kunth) Oberm., comb. nov. Type: Cape Province, *Lalande s.n.* (P, lecto.; PRE, photo!).

Asparagopsis densiflora Kunth: 96 (1850). *Asparagus sarmentosus* var. *densiflorus* (Kunth) Bak.: 625 (1875). *Asparagus densiflorus* (Kunth) Jessop: 65 (1966).

Asparagus sarmentosus var. *comatus* Bak.: 625 (1875). Syntypes: Cap. bon. spei, *Hort. Kew* 1778; *Cooper* 192; *Cooper* 402; *Cooper* 3251; *Admiral Grey s.n.*; *Murray s.n.*; *MacOwan* 1772.

Asparagus myriocladus Bak.: 43 (1889); Bak.: 271 (1896). Type: Natal, Inanda, *Medley Wood* 355 (K, holo.; NH!; PRE, photo!).

Asparagus sprengeri Regel: 302 (1890); Bak.: 271 (1896). Type: described from a cultivated specimen received from Durban.

Asparagus ternifolius (Bak.) Hook. f.: t. 7728 (1900). *A. aethiopicus* var. *ternifolius* Bak.: t. 261 (1871). Type: living material sent from Durban by Thomas Cooper, which flowered in England in Wilson Saunders's nursery.

Asparagus sarmentosus auct. non L.: Bak.: 625 (1875); Watson: 746, t. 94 (1894).

Asparagus tetragonus auct. non Bresler: Prain: t. 8288 (1909).

Moritz Bresler (1802–1851), a German physician, wrote a thesis entitled 'Generis Asparagi historia naturalis atque medica', in which he described a number of South African species. His herbarium and types are unknown, cf. Barnhart: 248 (1965).

Plants erect or with simple, spreading or recumbent, striate, spiny stems. *Rhizome* with the long roots bearing tubers on side roots. *Branches* short, more or less equally long, close together. *Spines* short, recurved. *Cladodes* evergreen, one to few in a fascicle, terete, 5–15 \times 1–2 mm.

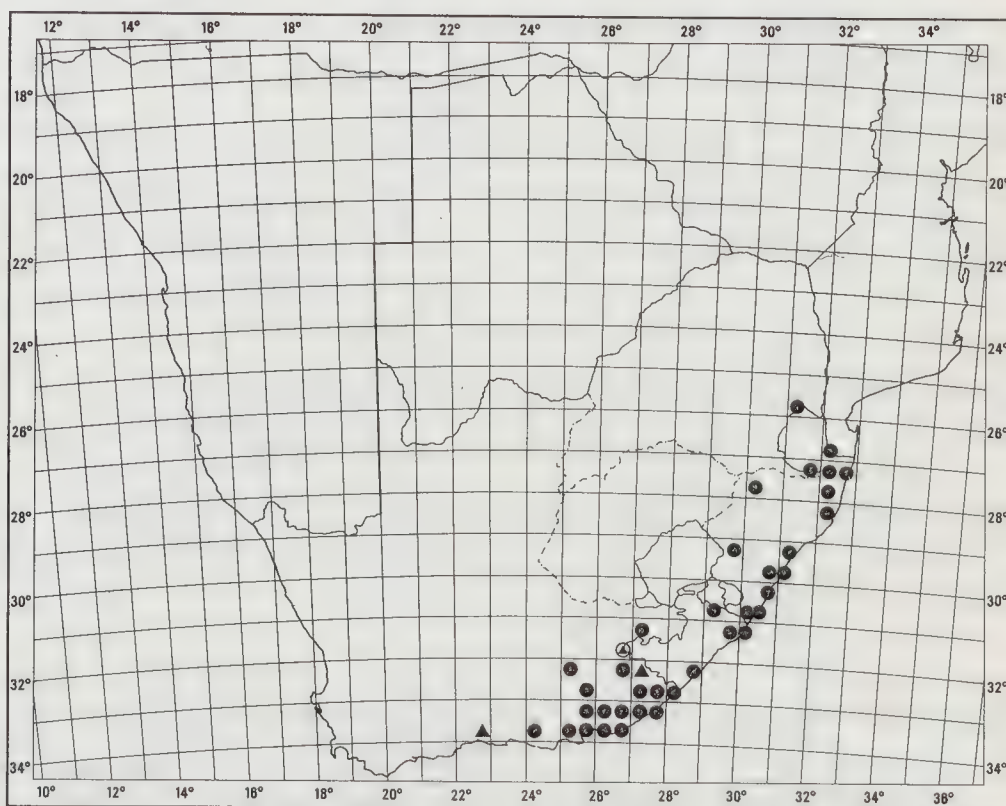
Racemes (modified branchlets) simple, short, 20–50 mm long, many-flowered or reduced to a few flowers, borne in axils and along branches; bracts small, membranous or minutely spinous; tepals linear, spreading, 4 mm long, white with a pink tinge, glistening; stalks short, articulated near middle. *Stamens* erect, with yellow or orange anthers. *Ovary* with 4 ovules in each locule; globose, white. *Berry* red, \pm 10 mm in diameter. Figure 11.

A common and variable species of the eastern region, i.e. southern and eastern Transvaal, Natal and eastern Cape; also in Mozambique; habitat variable. Map 30.

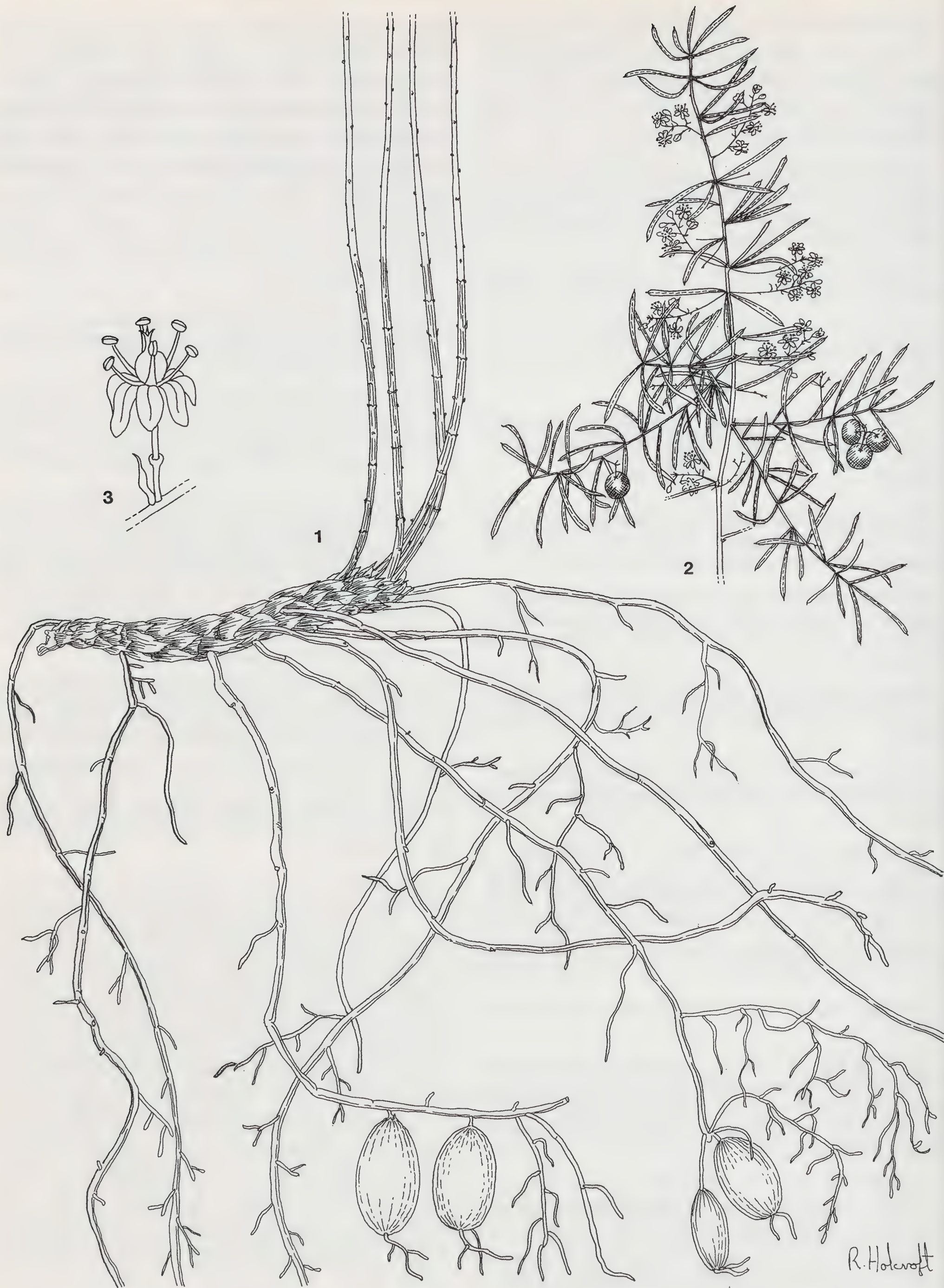
This species is easy to cultivate and is therefore much used in parks and gardens or as a pot plant. It is commonly cultivated in Europe, and is the most successful cultivated species in this genus. The seeds are spread by birds.

Cv. 'Sprengeri': When at Kew (1923-07-26), Burt Davy wrote the following note: 'The late Dr Medley Wood informed me that, recognizing its possible horticultural value, he sent seeds to Sprenger (of Messrs Dammann & Co., Naples), who propagated and distributed it and received the credit for introducing it into cultivation (as *Asparagus sprengeri* Regel), though it was really Medley Wood's introduction'. It was also sent to England by Thomas Cooper.

Cv. 'Meyersii': The cultivar Meyersii is a trade name, after the nurseryman Meyers from East London, who introduced this compact erect form. A strain of wild plants found in the eastern Cape, showing a tendency to shorten their branches were, through selection, changed to a compact cylindrical shape. The cladodes are smaller and the raceme is reduced to a few flowers; the red berries are borne inside the cylinder next to the stem.



MAP 30. — ● and ▲ *Protasparagus densiflorus*
▲ and ▲ *P. filicladus*



Prain (1909) described the root system of the synonym *A. tetragonus* as follows: '*A. tetragonus* has a rootsystem remarkable for the large, whitish, watery, ovate tubers which are formed along the principal roots and are calculated to enable the plant to endure prolonged periods of drought'. This has proved to be true; species with tuberous roots will survive transplantation but those with plain cylindrical roots do not.

Vouchers: *Baur sub Marloth* 8729; *Breyer PRE* 57213; *Galpin* 2094; *Germishuizen* 1624; *Jessop* 607; *Pegler* 1482; *Venter* 914; *Ward* 4921.

40. *Protasparagus filicladus* Oberm., sp. nov. *a P. conferto cladodiis multis in quoque fasciculo differt.*

Suffrutex erectus spinosus glaber $\pm 0,6$ m altus, ramis longis sursum curvatis. Rhizoma radicesque non vidi. Caules laete grisei, laeves, internodiis brevibus et spinis brevibus acribus recurvis sub nodis plurigemmatibus. Rami ad 0,2 m longi sursum curvati fasciculos confertis cladodiorum ferentes. Cladodia in quoque fasciculo $\pm 15-25$, $\pm 10-15$ mm longa curvata laete viridia apiculata; fasciculi cladodiorum interdum floribus paucis. Ramuli juxta ramos positi, sed breviores, etiam sursum curvati, aphylli, flores fasciculis sessilibus vel glomerulis deminutis ramosis. Flores pedicellis ± 3 mm longis, parum infra medium articulatis, tepalis late linearibus, ± 2 mm longis. Stamina antheris flavis. Ovarium globosum, stylo perbreve, ovulis in quoque loculo 4. Baccam non vidi.

Type: Cape, 3126 (Queenstown): (–DD), Fincham's Nek, *Galpin* 2195 (PRE, holo., GRA, iso.).

Erect, spiny, glabrous suffrutex, $\pm 0,6$ m high, with long branches curved upwards. Rhizome and roots not seen. Stems pale grey, smooth with short internodes and short, sharp, recurved spines below multibudded nodes. Branches up to 0,2 m long, curved upwards, bearing cladode fascicles placed close together. Cladodes $\pm 15-25$ in each fascicle, $\pm 10-15$ mm long, curved, pale green, apiculate; a few flowers occasionally present.

Branchlets placed beside branches but shorter, also curved upwards, leafless, bearing flowers in sessile fascicles or in reduced, branched clusters; flowers with tepals broadly linear, ± 2 mm long; on stalks ± 3 mm long, articulated just below middle. Stamens with yellow anthers. Ovary with 4 ovules in each locule; globose; topped by a very short style. Berry not seen.

Endemic to southern and eastern Cape; in grassveld and open savanna. Map 30.

Vouchers: *Jessop* 658; *Oliver* 8406.

41. *Protasparagus confertus* (Krause) Oberm., comb. nov. Type: Namibia, Schakalskuppe, *Engler* 6764 (B, holo.; PRE, photo.).

Asparagus confertus Krause: 449 (1914); Sölch et al.: 32 (1966).

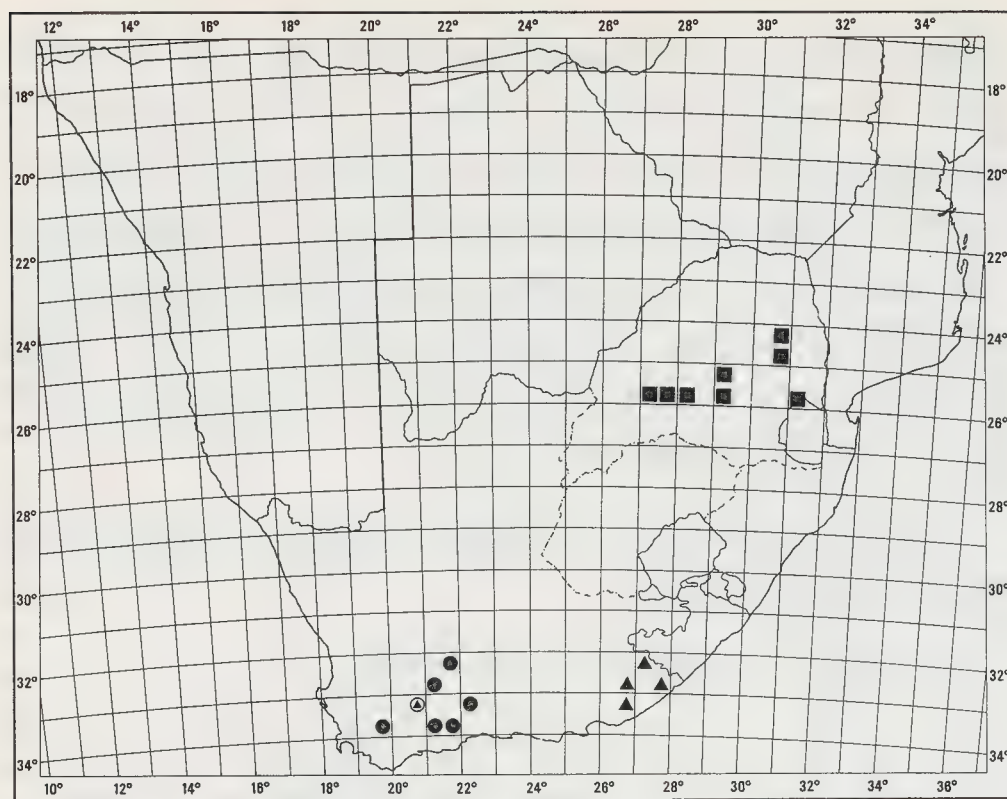
Erect, glabrous, glaucous, very spiny, harsh shrublets, ± 1 m high. Rhizome large, woody. Roots bearing tubers on side roots. Stems strong, woody, with short internodes, bearing spreading branches $\pm 0,15$ m long, and shorter branchlets, all closely ribbed and distinctly papillate with bulging, shiny cells. Spines orange brown, exerted, ± 10 mm long, becoming smaller below branchlets, cladodes and flowers. Cladodes 1–3 in a fascicle, erect, narrowly linear, $\pm 10-15 \times 2$ mm, mucronate, margin raised, papillate. Racemes (flowering branchlets) axillary, 1–3 in axils of branches, simple, ± 50 mm long; flowers solitary or binate; tepals persisting below berry; stalk ± 4 mm long, articulated near base. Stamens and gynoecium not seen. Berry (when dry and wrinkled) ± 7 mm in diameter.

Occurs in western and south-western Cape and Little Karoo. Map 31.

Vouchers: *Bayer* 3671a; *Jessop* 702; *Mauve* 5436.

42. *Protasparagus krebsianus* (Kunth) Oberm. in South African Journal of Botany 2:

FIGURE 11. —*Protasparagus densiflorus*: 1, showing rhizome, roots and tubers, $\times 0,6$; 2, branch with cladodes, flowers and berries, $\times 1,2$; 3, flower, $\times 3$ (after *Stirton* 9051). Artist: R. Holcroft.



MAP 31.—● and △ *Protasparagus confertus*
▲ and ○ *P. krebsianus*
■ *P. transvaalensis*

244 (1983). Type: Cape Province, without precise locality, *Krebs s.n.* (KIEL[†]; B[†]); Cape Province, Komga, *Flanagan 2377* (PRE, neo.!, BOL, GRA).

Asparagopsis krebsiana Kunth: 93 (1850). *Asparagus krebsianus* (Kunth) Jessop: 74 (1966) pro parte.

Asparagus racemosus var. *tetragonus* auct. non Willd.: Bak.: 624 (1875); Bak.: 269 (1896).

Erect, glabrous, spiny, glaucous shrublets ± 1 m high, evergreen. *Rhizome* typical, hard, woody, with tubers on side roots. *Stems* ribbed when young, becoming smooth with age. *Spines* sharp, exserted, ± 10 mm long, present below branches and cladode fascicles. *Branches* close together, axils multibudded, bearing branchlets and racemes. *Cladodes* 1–4 in a fascicle, triangular in cross-section, $\pm (10\text{--})15\text{--}20 \times 1\text{--}2$ mm, smooth, apiculate. *Racemes* simple, 50–80 mm long, closely beset with solitary flowers on short, persistent stalks and bracts, subtended by small spines; tepals narrowly obovate, ± 3 mm long. *Stamens* with thin filaments and yellow anthers. *Ovary* with ± 6 ovules in each locule; globose. *Berry* ± 10 mm in diameter, red.

Recorded from eastern Cape and Montague; in open veld amongst scrub. Map 31.

Vouchers: *Acocks 1145*; *Archibald 5488*; *Daly & Sole 216*; *Jessop 659*; *Jessop 702*; *Schonland 1612*; *Van Breda & Joubert 2121*.

43. *Protasparagus transvaalensis* Oberm., sp. nov. a *P. krebsiano* *antheris purpureis et cladodiis 1–2(3) in quoque fasciculo differt.*

Frutices erecti acerbi spinosi ramosissimi glabri ± 1 m alti. Rhizoma typica radicibus lateralibus tubera ferentibus. Caules veteres lignosi ± 10 mm diametro, juvenes leviter fractiflexi internodiis brevibus leviter costati. Spinae exsertae ± 6 mm longae infra nodos fasciculosque cladodiorum, infra flores parcae. Rami soli vel ramis lateralibus. Ramuli multi. Cladodia 1–2(3) in quoque fasciculo 15–30 (–50) mm longa erecta rigida filiformia. Racemi (rami mutati) simplices, floribus solitariis vel binatis, a spinulis parvis reflexis et bracteis erectis amplexantibus subtentis. Perianthium tepalis anguste obovatis albis 3 mm longis; pedicello ± 3 mm longo, basin versus articulo. Stamina antheris atropurpureis. Ovarium ovulis in quoque loculo 6–8; globosum brunneolum; stylo brevissimo, stigmatibus 3 aliquantum quam stylus longioribus. Bacca 8 mm diametro, rubra.

Type: Transvaal, 2527 (Rustenburg): (–CA), Rietvallei Nature Reserve, Magaliesberg plateau, between boulders, *B.J. Coetzee 1461* (PRE, holo!).

Erect, harsh, spiny, much branched, glabrous shrubs ± 1 m high. *Rhizome* typical with side roots bearing tubers. *Old stems* woody, ± 10 mm in diameter. *Young stems* slightly zigzagging, with short internodes, faintly ribbed. *Spines* exserted, present below nodes and cladode fascicles, ± 6 mm long, small below flowers. *Branches* single or flanked by side branches; branchlets numerous. *Cladodes* 1–3 in a fascicle, erect, stiff, filiform, 15–30(–50) mm long. *Racemes* (modified branchlets) simple, flowers solitary or binate, subtended by small, reflexed spines and erect, clasping bracts. *Perianth* with tepals narrowly obovate, 3 mm long, white; on a stalk ± 3 mm long, articulated near base. *Stamens* with dark purple anthers. *Ovary* with 6–8 ovules in each locule; globose, light brown; style very short, with 3 spreading stigmas somewhat longer than style. *Berry* 8 mm in diameter, red.

Recorded from Transvaal, from Rustenburg in the west to the Blyde Nature Reserve in eastern Transvaal, common on

the Magaliesberg; in rocky places, hillslopes and kranzes in bushveld. Map 31.

Related to *P. krebsianus* (no. 42), an eastern Cape species, but with longer, erect cladodes and flowers with longer pedicels, more loosely arranged along the axis. The anthers are dark. A shy flowerer.

Vouchers: *Codd* 6805; *Fourie* 1325; *Leendertz* 531; *Mauve*, *Reid & Smook* 5379; *Mogg* 15103; *Repton* 4915; *Smith* 351; *Theron* 813; *Vahrmeijer* 1263; *Van Wyk* 107.

44. *Protasparagus schroederi* (Engl.) Oberm. in South African Journal of Botany 2: 244 (1983). Type: Togo Republic, Togo, *Schroeder* 20 (B, holo.; PRE, photo!).

Asparagus schroederi Engl.: 97 (1903).

A. wildemanii Weim.: 446 (1937), nom. nov. for *A. striatus* De Wild.: 293 (1913); non *A. striatus* Thunb. Type: Upper Katanga: Kakonde, *Ad. Hock* (BRU, holo.).

A. obermeyeriae Jessop: 73 (1966). Type: Transvaal, Pietersburg district, near Boyne on road to Wolkberg, *Mauve* 4442 (PRE, holo.).

A. aspergillus sensu Jessop p.p.: 71 (1966) for specimens cited from Namibia.

Erect, rigid, spiny shrubs 0,5–1,0 m high, from a woody rootstock; roots with tubers on sideroots. *Stems* several, striate, the ridges bearing minute, sharp, transparent cells, rarely smooth, brown when young, grey with age. *Spines* sharp, \pm 5–15 mm long, patent to recurved. *Branches* spreading to arcuate, \pm 100–200 mm long, simple, close together, bearing overlapping cladode fascicles; spinules present below each fascicle. *Cladodes* \pm 3–10 per fascicle, filiform (somewhat triangular in cross section), up to 50 mm long, turning dark when dry, deciduous, absent at time of flowering (viz. August to October). *Flowering branchlets* similar to branches, appearing from same swollen nodes, persisting after flowering, studded with spinules and short pedicels. *Flowers* usually paired, placed close together along branchlets; bracts membranous, fimbriate, enclosing pedicels \pm 2 m long, which terminate in a swollen disc below perianth; tepals white or cream. *Stamens* with somewhat swollen filaments; anthers red. *Ovary* ovoid, dark, with 4 ovules in each locule. *Berry* red, \pm 8 mm in diameter.

Recorded from northern Namibia and northern Botswana to northern Transvaal; further north to Angola, Zimbabwe,

Zambia, Tanzania, Malawi, Katanga and the Cameroons. In dry, often sandy areas. Map 32.

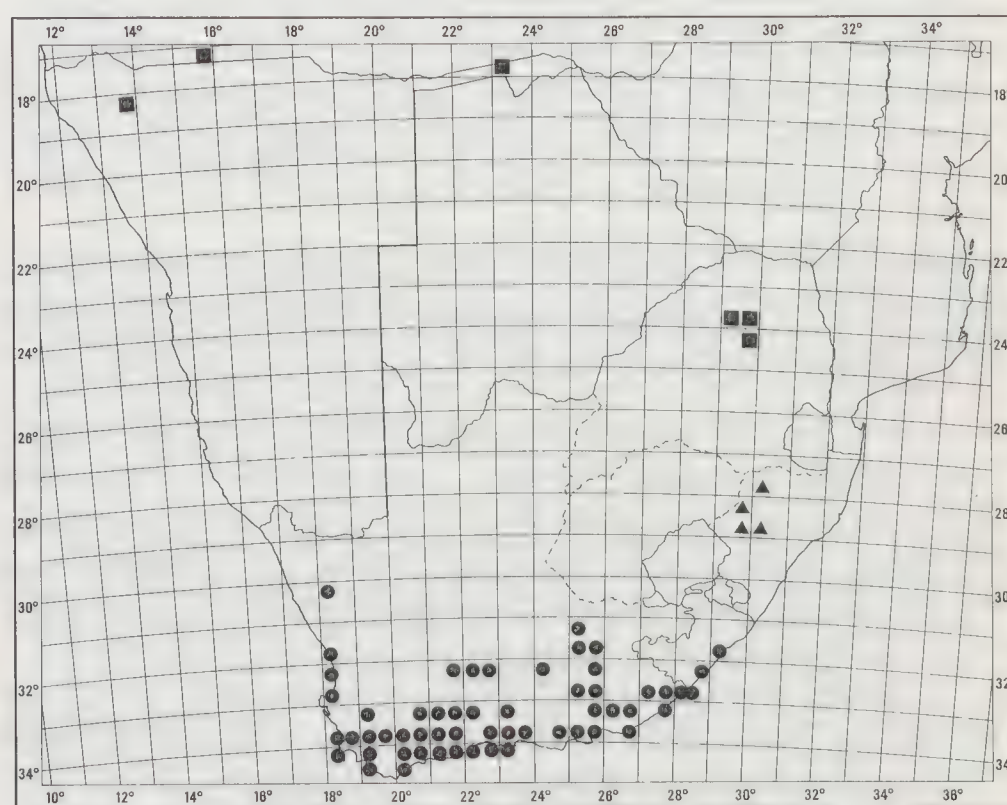
Vouchers: *Curson* 900; *Gerstner* 5359; *Hafström & Acocks* 197b; *Merxmüller & Giess* 1517; *Rodin* 9356; *Wright* G95.

45. *Protasparagus coddii* Oberm., sp. nov. *P. schroederi* affinis sed caulibus et ramis erectis paucispinosis, ramulis nullis, inflorescentiis prope basin dispositis.

Frutices (vel chamaephyta) erecti, glabri, ad \pm 0,3 m alti. Rhizoma et radices lignosi. Caules et rami erecti, sine ramulis. Spinae paucae, recurvatae, 3–5 mm longae, durae. Cladodia \pm 8–12 in quoque fasciculo, linearia, \pm 20 mm longa, griseo viridis. Flores in racemis densis brevibus prope basin plantarum; tepalis oblongis, \pm 2 mm longis; pedicellis \pm 5 mm longis. Stamina antheris flavis vel aurantiacis. Ovarium ovoideum stylo brevissimo attenuatum; stigmatibus 3; ovulis in quoque loculo 4. Bacca \pm 10 mm diametro fulva.

Type: Natal, 2730 (Vryheid): (–CB), Knight's Pass, \pm 4 km east of Utrecht, on doleritic hillside, in dense bushveld vegetation, *Story* 1766 (PRE, holo!).

Shrubs or chamaephytes, erect, glabrous, \pm 0,3 m high, flowering before cladodes develop.



MAP 32. — ■ *Protasparagus schroederi*
▲ *P. coddii*
● *P. aethiopicus*

Rhizome compact, woody, covered by numerous acute cataphylls. *Roots* (incomplete) spreading, many, long, cylindrical, ± 12 mm in diameter with some thin side roots. *Stems* several, simple, erect, placed close together, ridged, the ridges consisting of large transparent cells. *Spines* few, recurved, 3–5 mm long, hard. *Cladodes* ± 8 –12 per fascicle, linear, $\pm 20 \times 0.5$ mm, unequally long, flat above, margin and keel with large transparent cells, greyish green. *Racemes* near base of plant, maturing before cladodes develop, simple, short, dense, up to 250 mm long but usually shorter. *Flowers* 2–4 per fascicle, placed close together, subtended by minute, membranous bracts and a small, reflexed spine; pedicels short; tepals oblong, ± 2 mm long; stalk ± 5 mm long, disc placed near or below centre. *Stamens* with yellow or orange anthers. *Ovary* ovoid, attenuated into a short style; ovules 4 in each locule. *Berry* ± 6 mm in diameter, red.

Recorded from western Natal, often in overgrazed areas near Estcourt; in dense bushveld vegetation. Map 32.

Named after Dr L.E. Codd in appreciation of his contribution to South African botany.

Vouchers: *Mauve* 4477; *West* 364; *West* 1167; *West* 1209.

46. *Protasparagus aethiopicus* (L.) Oberm. in South African Journal of Botany 2: 243 (1983). Type: Cape, without precise locality (LINN, 434,6, neo.; NBG!, PRE, photo!).

Asparagus aethiopicus L.: 63 (1767); Willd.: 153 (1799); Roem. & Schult.: 335 (1829); Bak.: 626 (1875); Bak.: 271 (1896); Salter: 175 (1950); Jessop: 67 (1966); Mason: t. 10,4 (1972). *Asparagopsis aethiopica* (L.) Kunth.: 95 (1850).

Asparagus lanceus Thunb.: 66 (1794). *Asparagopsis lancea* (Thunb.) Kunth: 104 (1850). Type: without precise locality, *Thunberg s.n.* (No. 8452 in UPS, PRE, microfiche!).

Asparagus sarmentosus var. *kunthii* Bak.: 625 (1875). Based on type of *Asparagus lanceus*. This variety is an accepted taxon in *Flora capensis* 6: 270 (Bak. 1896) but is not treated in Jessop (1966) or by Obermeyer (1983). It is placed here by Immelman after seeing a microfiche of the type specimen.

A. tetragonus Bresler: 27 (1826). *A. racemosus* Willd. var. *tetragonus* (Bresler) Bak.: 624 (1875); Bak.: 269 (1896). Type: South Africa, *Mund & Maire s.n.* (B, holo.).

A. racemosus var. *decipiens* Bak.: 269 (1896). Type: Cape Province, on the rocks of Zwartwater Poort, *Burchell* 3403 (K!).

A. racemosus auct. non Willd.: Jessop: 72 (1966).

? *Asparagopsis subquadrangularis* Kunth: 94 (1850). Type: *Mund, Maire* (B[†]). In the PRE copy of Jessop (1966), this name is marked '= *aethiopicus*' by Obermeyer. It is not otherwise dealt with by her.

Tall, woody, robust climbers up to 3 m high, young stems twining. *Rhizome* compact, bearing many long roots with side roots forming ellipsoid tubers ± 20 mm long, as well as a large network of white, branched rootlets. *Stems* firm, smooth, woody, ribbed when young, pale. *Spines* short, ± 10 –20 mm long, exserted, recurved, hard. *Branches* many, close together, fairly equal in length, ± 120 mm long; on older branches branchlets appear from knobs above spines and are enveloped basally by a flush of small bracts. *Cladodes* 4–6 in a fascicle, terete or ridged, 10–40 mm long, 1.0–1.5 mm wide, apiculate, discoid at the base, glaucous green. *Racemes* many, placed all along the branches, from basal side buds, usually exserted, simple or with some short branchlets; tepals with the 3 outer perianth segments minutely ciliate, forming a long pericladium, white; pedicels short, subtended by bracts, both persisting after flowers have dropped off. *Stamens* with orange (or red?) anthers. *Ovary* dark, contracted below; ovules 4 in each locule. *Berry* red.

A common species in the Cape Province, widespread both in western and eastern parts, but not in central Karoo or northern Cape; usually in dry areas, shale hills, coastal bush. Map 32.

Vouchers: *Burgers* 1679; *Ecklon & Zeyher* 8; *Galpin* 6419; *Goldblatt* 5571; *Marloth* 12006; *Mauve* 5431; *Mauve & Hugo* 165; *Van Breda* 4499; *Van Wyk & Kok* 5827.

47. *Protasparagus clareae* Oberm., sp. nov. *P. aethiopico affinis sed gracilior racemis brevis.*

Plantae scandentes altae graciles glabrae. Rhizoma lignosum, radices multae ± 6 mm diametro, velamine pilorum radicalium tectas ferens; radices laterales breves tubera ellipsoidea ± 20 mm longa aggregata formantes. Caulis erectus strictus ± 5 mm diametro, minute costatus papillatus. Spinae breves crassae recurvatae durae, infra cladodia absentes. Rami tenues longi cauli similes, ramulos breves simplices ferentes, quorum nonnulli cladodiis ad ± 90 mm longis,

alii racemis 30–40 mm longis. Cladodia in quoque fasciculo ± 6 , filiformia ± 20 mm longa apiculata, basin obtusa, ut videtur aliquantum 3-costata siccis. Racemi 1–2 e nodo, simplices, 30–40 mm longi. Flores crebri, bracteis acuminatis membranaceis furvis; perianthium persistens, tepalis albis anguste obovatis, 2 mm longis, apice minute dentatis; pedicellis ± 3 mm longis, basin versus articulatis, disco annulum pallidum faciens. Stamina antheris flavis. Ovarium pyriforme, ovulis in quoque loculo 4; stylo stigmatibusque brevibus. Bacca 5 mm diametro, rubra succida.

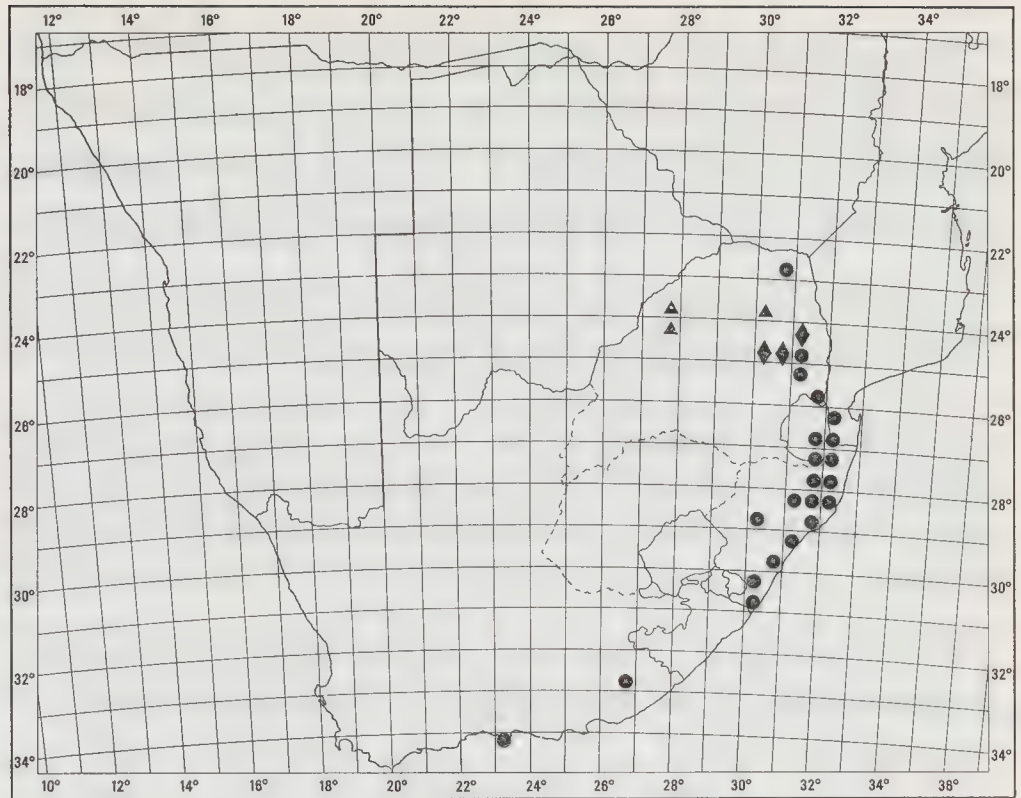
Type: Transvaal, 2430 (Pilgrim's Rest): (–CB), 6 km from Burgersfort on road to Ohrigstad, in thicket on N side of road, near river, *Mauve, Reid & Smook 5413* (PRE, holo.).

Tall, slender climbers. *Rhizome* woody, bearing numerous, long roots, ± 6 mm in diameter, covered by a velamen of root hairs; side roots short, swollen to form ellipsoid, pointed tubers ± 20 mm long, placed close together. *Stem* erect, straight, ± 5 mm in diameter, minutely ribbed and papillate. *Spines* short, thick, recurved, hard, absent below cladodes. *Branches* thin, long, similar to stem, bearing short, simple branchlets, some of these bearing cladodes and up to ± 90 mm long, others the simple racemes. *Cladodes* in fascicles of ± 6 , filiform, appearing somewhat 3-ribbed when pressed, ± 10 mm long, apiculate, base obtuse. *Racemes* 1 or 2 from a node, simple, 30–40 mm long. *Flowers* closely placed; bracts acuminate, membranous, dark; perianth persistent, tepals white, narrowly obovate, 2 mm long, apex minutely dentate; stalks ± 3 mm long, articulated near base, the disc forming a pale ring. *Stamens* with yellow anthers. *Ovary* pyriform, ovules 4 in each cell, style and stigmas short. *Berry* 5 mm in diameter, red, juicy.

Recorded from eastern Transvaal in the Olifants River valley, and in the Blyderivierspoort Nature Reserve; in succulent bushveld. Map 33.

The type plants were dug out in August, after the dry winter months. It was seen that many of the root tubers were 'empty' husks, the fluid having been absorbed by the plant. Named for Clare Reid, of the National Botanical Institute, Pretoria, who loves plants.

Vouchers: *Obermeyer & Verdoorn 22; Reid PRE 672543; Viljoen 159.*



MAP 33. — ◆ *Protasparagus clareae*
▲ *P. aggregatus*
● *P. natalensis*

48. *Protasparagus aggregatus* Oberm., sp. nov. *a P. natalensi fasciculis cladodiorum in dimidio supero ramulorum brevium aggregatis inflorescentiisque parvioribus compactioribus sine cladodiis interspersis differt.*

Plantae scandentes ad 3 m altae. Caulis glaber. Spinae reflexae, breves. Rami et ramuli juniore laxè dispositi, minute papillati. Cladodia in dimidio supero ramulorum aggregata, anguste linearia, $\pm 15\text{--}20 \times 1,5$ mm, apiculata. Racemi compositi ad 50 mm longi. Flores 1–3, fasciculati, bracteis membranaceis ad basin spiniferis; tepala oblonga, ± 3 mm longa. Stamina flava. Ovarium ovulis in quoque loculo 6; ovoideum. Bacca ignota.

Type: Transvaal, 2327 (Ellisras): (–DC), near Elmeston, 41,5 miles from Vaalwater on Ellisras road, mixed bushveld on rocky soil, *Meeuse & Strey 10430* (PRE, holo.).

Scandent, up to 3 m high. *Stems* smooth, grey, bearing short, reflexed spines. *Young branches* and branchlets widely spaced, minutely papillate and somewhat ridged when young. *Cladodes* aggregated in upper half of short branchlets, flat, narrowly linear, $\pm 15\text{--}20 \times 1,5$ mm, apiculate, drying a dark grey. *Inflorescence* a compound raceme, ± 50 mm long. *Flowers* in fascicles of 1–3, subtended by a membranous bract bearing

a small spine below; tepals oblong, ± 3 mm long, smooth and obtuse above, cream. *Stamens* yellow. *Ovary* with ovules 6 in each locule; ovoid; attenuated into 3 short stigmas. *Berry* not seen.

Occurs in northern Transvaal; in mixed bushveld, on dry sandy soil or rocky hillslopes. Map 33.

Related to *P. natalensis* (no. 49) but with the cladodes aggregated in upper half of the short branchlets; the inflorescence is smaller, more compact and without interspersed cladodes.

Vouchers: *Du Toit* 798; *Du Toit* 886; *Krijt* 73; *Schlieben & Hartmann* 12026; *Werdermann & Oberdieck* 1774.

49. *Protasparagus natalensis* (Bak.) Oberm. in South African Journal of Botany 2: 244 (1983). Type: Natal, Inanda, *Medley Wood 1351* (K, holo.; PRE, photo.!, NH, iso.!).

Asparagus aethiopicus L. var. *natalensis* Bak.: 272 (1896). *A. aethiopicus* L. var. *ternifolius* auct. non Bak. (1871): Jessop: 70 (1966).

Tall, evergreen, glabrous climbers or forming a suffrutex in the open. *Rhizome* bearing long roots with tubers on side roots. *Stems* woody, pale grey, striate when young, becoming smooth with age; nodes thick, bearing spines, branches and branchlets. *Spines* small, exserted, present below branches, branchlets, cladode fascicles and flower fascicles. *Branches* and branchlets fairly short. *Cladodes* on branches, 1–4 per fascicle, persistent, linear, $\pm 20 \times 2$ mm, apiculate, base narrowed into a discoid foot, firm, bright dark green, usually turning dark when dry. *Inflorescences* (flowering branchlet) long, compound or reduced to simple racemes, often with some cladodes present. *Flower fascicles* subtended by a small spine and small membranous bracts; outer tepals ciliate, white; stalk stout with a large membranous frilled disc in lower half. *Stamens* with yellow or pale orange anthers. *Ovary* with 6–8 ovules in each locule; globose; style and stigmas short. *Berry* red or orange.

Occurs in eastern Transvaal, Swaziland, Natal, and possibly also in southern and eastern Cape; also in Mozambique and further north; in dry bushveld, common where found. Map 33.

Vouchers: *Acocks* 12936; *Compton* 30323; *Fourie* 2075; *Gerstner* 2421; *Gush* 30; *Strey* 11335; *Vahrmeijer* 431; *Van der Schijff* 1130; *Ward* 4452; *Zambatis* 287.

50. *Protasparagus angusticladus* (Jessop) Oberm. in South African Journal of Botany 2: 243 (1983). Type: Transvaal, Middelburg district, Olifants River Gorge, *Mogg* 22470 (PRE, holo.!).

Asparagus aethiopicus L. var. *angusticladus* Jessop: 69 (1966).

Tall, glabrous climbers up to 3 m high, spreading in upper branches of trees, deciduous. *Roots* with tuberous side roots. *Stems* terete, ± 10 mm in diameter below, mottled grey, smooth. *Spines* short, patent-recurved, longer and swollen near base of stem, up to 20 mm long, upper progressively smaller, present (but minute) below flowers. *Branches* twining, slightly zigzagging; branchlets thin, fairly short, ± 80 mm long, bearing cladodes and/or flowers. *Cladodes* deciduous, 1–3 per fascicle, narrowly linear, slightly curved, $\pm 40\text{--}50 \times 1$ mm, margin minutely beaded with transparent cells. *Racemes* appearing before cladodes, compound, $\pm 300\text{--}400$ mm long, irregularly branched, young branchlets angled and beaded. *Flowers* solitary or in fascicles of 2–4, on short side branchlets; with spreading oblong tepals, ± 3 mm long, white; stalk ± 4 mm long, articulated near base. *Stamens* with red anthers. *Ovary* with 4 ovules in each locule; ovoid; style and stigmas short. *Berry* ± 8 mm in diameter, red, shiny.

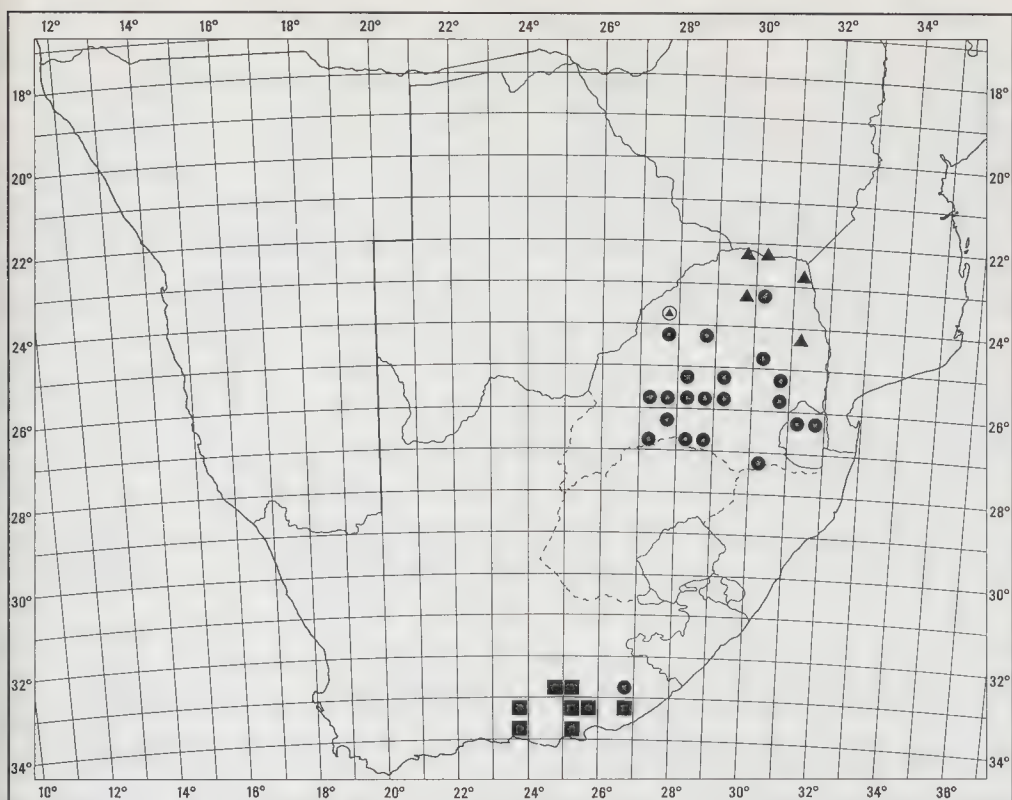
Recorded from Transvaal, common around the Witwatersrand and Pretoria areas, Swaziland, Natal and eastern Cape (Hogsback); also from neighbouring Mozambique territory; in bushveld. Map 34.

Vouchers: *Codd* 10268; *Coetzee* 258; *Compton* 28002; *Kluge* 1305; *Mogg* 19574; *Roberts* TM 15839; *Thode* A250.

51. *Protasparagus aspergillus* (Jessop) Oberm. in South African Journal of Botany 2: 243 (1983). Type: Transvaal, Letaba district, Birthday Gold Mine, *Breyer* TM 19063 (PRE, holo.!).

Asparagus aspergillus Jessop: 71 (1966) p.p. excl. Namibia specimens.

Slender, erect or twining shrubs up to 2 m high, leafless when flowering. *Rhizome* and roots unknown. *Stems* grey, finely striate with minute, conical, transparent papillae. *Branches* from nodes with multiple buds, annual (or



MAP 34.—● and ▲ *Protasparagus angusticladius*
▲ and △ *P. aspergillus*
■ *P. crassicladius*

biennial?). *Cladodes* hysteranthous, in fascicles of ± 4 , subtended by a small, narrowly linear bract, $\pm 20-30 \times 0.5$ mm, with an indistinct keel. *Flowering stems* 300–500 mm long, naked, with 1–3 short simple racemes from each node; racemes compact, $\pm 20-30$ mm long; basal spine small, bracts small, semiovoid, apiculate, fringed, shiny brown; tepals ± 3 mm long, white; pedicels 1.5 mm long, articulated at apex; disc swollen, flat. *Stamens* with filiform filaments and blackish purple anthers. *Berry* 6 mm in diameter, dark.

Recorded from northern and eastern Transvaal; also from Zimbabwe, Mozambique and Malawi; in bushveld areas. Map 34.

Vouchers: Breyer TM 21592; Brynard & Pienaar 4488; Curson 900; De Winter & Giess 7053; Rodin 9356; Rogers 19418; Van der Schijff 518; Van Wyk 5562.

52. *Protasparagus crassicladius* (Jessop)
Oberm. in South African Journal of Botany 2: 243 (1983). Type: Cape Province, Uniondale district, Kouga, *Esterhuysen* 4670 (BOL, holo.).

Asparagus crassicladius Jessop: 75 (1966).

Scandent or spreading, somewhat coarse shrublets up to 2 m high. *Rhizome* broad, flat, hard, woody. *Roots* cylindrical, somewhat swollen, pale; side roots forming fusiform tubers.

Stems stout, glabrous with age, bearing raised, short, recurved spines. *Branches* short, somewhat spreading, zigzagging, densely and minutely pubescent when young, greyish, bearing sessile cladode fascicles or these placed on branchlets. *Cladodes* curved, up to ± 25 mm long and 1 mm in diameter, oval in cross section, succulent, apiculate, base discoid, placed on a semiglobose torus, covered by circular pads. *Flowering branchlets* 1–several, arising next to cladode-branchlets, thin, minutely pustulate, drying black, bearing sessile and pedunculate flower fascicles. *Flowers* obconical in bud, subtended by membranous bracts; tepals narrowly ovate, ± 3 mm long, yellow or cream. *Stamens* with small anthers. *Ovary* with 4 ovules in each locule; ovoid; style short with 3 short spreading stigmas. *Berry* not seen.

Recorded from the eastern Cape, near Port Elizabeth, Uitenhage and Bathurst, often collected in the Great Fish River areas. In dry bushveld areas or succulent scrub. Map 34.

As in *P. mucronatus* (no. 25), *P. stellatus* (no. 58) and *P. microrhaphis* (no. 57), the cladode bases are discoid and fit onto raised pads on the torus.

Vouchers: Bayliss 6332; Hall-Martin 5745; Jacot Guillarmod & Brink 8; Jessop 617; Jessop 631; Jessop 639; Repton 5674; Smook 3841; Werdermann & Oberdieck 1045.

53. *Protasparagus acocksii* (Jessop)
Oberm. in South African Journal of Botany 2: 243 (1983). Type: Cape Province, Cradock district, ± 18 km north-north-east of Fish River Station, *Acocks* 16296 (PRE, holo.).

Asparagus acocksii Jessop: 74, t. 7 (1966).

Large, shrubby plants or scandent, up to 3 m high but short and compact in south-eastern Cape. *Rhizome* not seen; roots tuberous (fide Reid). *Stems* more or less straight, becoming furrowed with age, ± 10 mm in diameter, lower nodes with swollen buds bearing short, broad, recurved spines and swollen bracts. *Young branches* shortly and densely pubescent, glabrous with age, the flaking dry white skin stippled with minute black dots. *Spines* present below branches, branchlets and cladode fascicles, short, broad, hard, patent, acute, ± 10 mm long, decreasing in size up the plant. *Cladodes* varying in size and number, numerous (up to 40) in

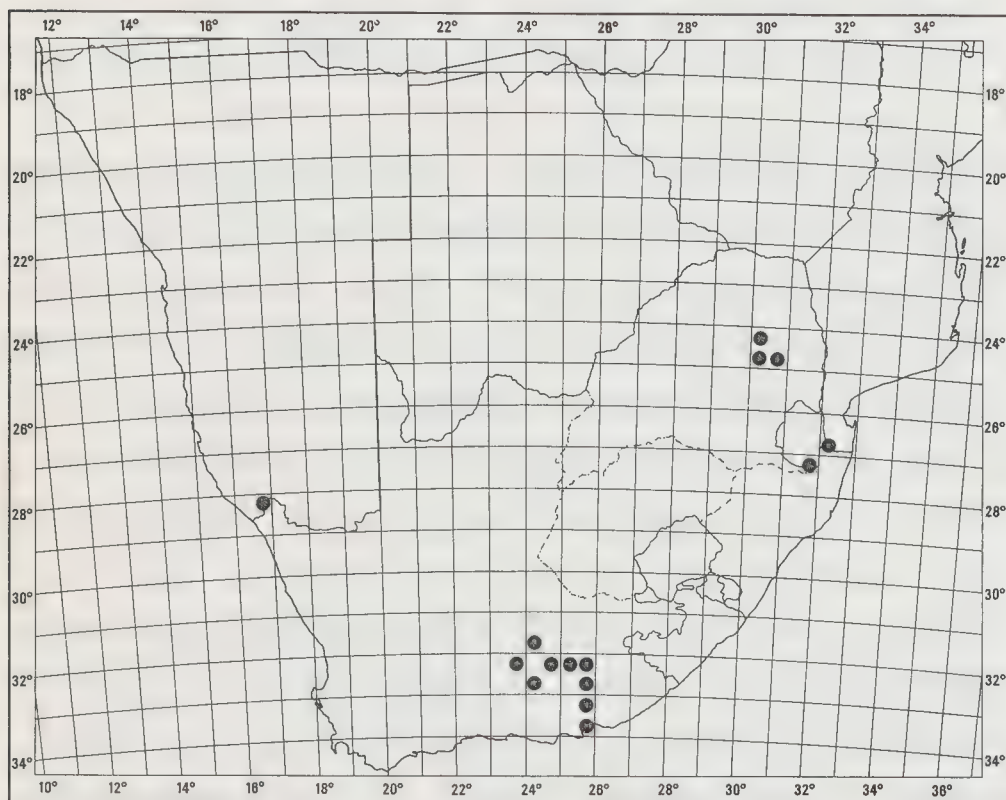
a fascicle, filiform, curved, apiculate, ± 5 mm long in typical form, but up to 35 mm long in Zululand form. *Flowers* in short, simple or complex, branched, delicate racemes, drying black, contemporary with cladodes, strongly scented; tepals spreading, narrowly obovate, ± 3 mm long, attenuated into a long pericladium, white; stalk thin, ± 5 mm long, articulated near base. *Stamens* with yellow anthers. *Ovary* with ± 4 ovules in each locule; ovoid; style very short with 3 short spreading stigmas. *Berries* ± 6 mm in diameter.

Recorded from eastern Cape and, disjunctly, in Zululand and eastern Transvaal. There is also a rather dubious locality in the far south of Namibia. The southern (typical) form is more xerophytic with shorter cladodes; the subtropical form is a large shrub or climber with cladodes up to 35 mm long and with more complex racemes. Usually in bushveld or savanna, occasionally in grassveld or where overgrazed. Flowering October to January and March. Map 35.

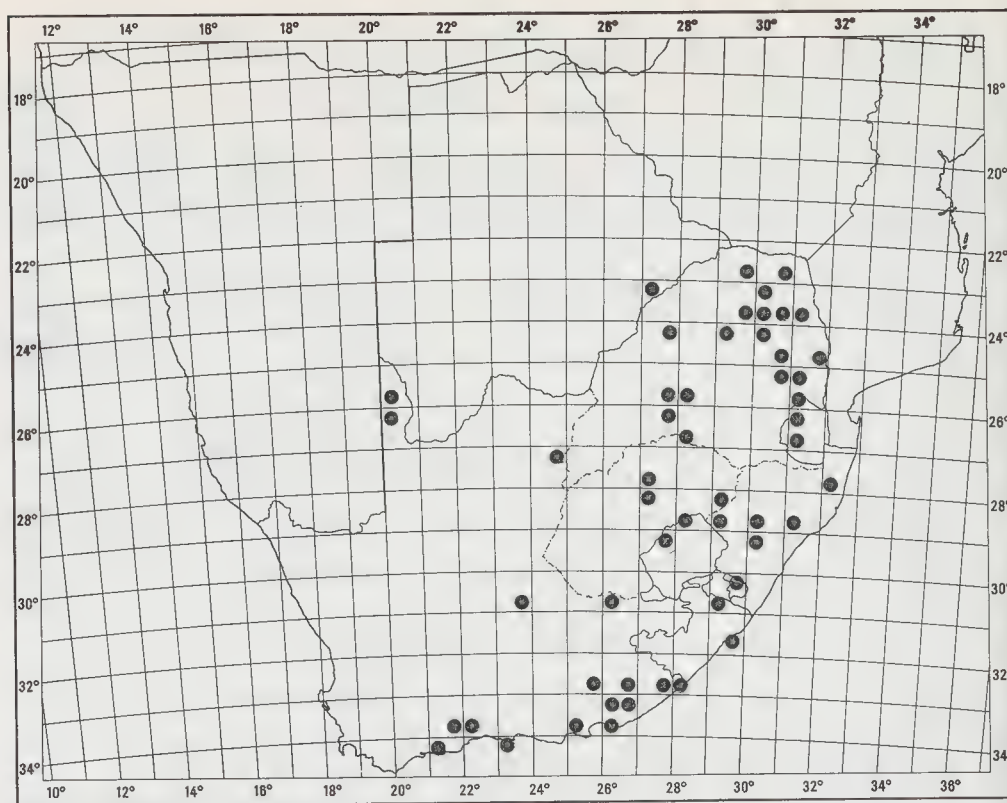
Vouchers: Drège PRE 3164; Pooley 115; Reid 491; Ward 4522; Young A616.

54. *Protasparagus setaceus* (Kunth)
Oberm. in South African Journal of Botany 2: 244 (1983). Type: 'Drège, Herb. no. 8584, c.v.s. in Herb. reg. Berol. et Luc.' (B[†]; KIEL, lecto.; PRE, photo.).

Asparagopsis setacea Kunth: 82 (1850). *Asparagus setaceus* (Kunth) Jessop: 51 (1966), proparte excl. *A. plumosus* Bak.



MAP 35.—*Protasparagus acocksii*



MAP 36.—*Protasparagus setaceus*

Asparagus declinatus auct. non L. (which is *Myrsiphyllum declinatum*): Bak.: 609 (1875); Bak.: 261 (1896).

Asparagus conglomeratus Bak.: 176 (1904); non Bak. (1898) (which is *P. cooperi*). Type: Natal, Durban, Conrath 911 (GZU, holo.!; PRE, photo.).

Asparagus plumosus auct. non Bak.: Jessop: 51 (1966).

Evergreen perennial, erect or usually scandent, up to 2 m high, glabrous. *Rhizome* compact, woody; roots with swellings when young, spreading. *Stems* woody, smooth, bearing a few basal, short, hard spines, nonspinous above; with numerous spreading, loosely twining branches. *Branchlets* short, bearing numerous overlapping, glabrous cladode fascicles. *Cladodes* numerous in each fascicle, filiform, up to 15 mm long with age, soft, shiny. *Flowers* solitary in centre of apical cladode fascicle, placed on a small disc, surrounded by a few small, membranous bracts; tepals narrowly obovate, 3 mm long, white. *Stamens* with flattened filaments and yellow anthers. *Ovary* with ± 4 ovules in each locule; obovoid; style short, stigmas 3. *Berry* ± 5 mm in diameter, black.

Occurs from southern Botswana, Transvaal, O.F.S. and Natal to southern Cape (Riversdale area); also in tropical Africa; in undergrowth in moist, humus-rich soil. Not common. Map 36.

Vouchers: Codd 5283; Compton 24851; Devenish 1297; Jantjies 20; Netshiungani 776; Pott Leendertz 4689; Schlechter 6693; Verdoorn 52.

55. *Protasparagus plumosus* (Bak.) Oberm. in South African Journal of Botany 2: 244 (1983). Syntypes: Natal, Port Natal [Durban], Drège 4482 (K, syn., PRE, photo.); Cape Province, British Kaffraria, Cooper 202, partly (K, syn., PRE, photo.); Natal, Gerrard & M'Ken 754 (TCD).

Asparagus plumosus Bak.: 613 (1875); Bak.: 260 (1896).

Asparagopsis setacea auct. non Kunth: Jessop: 51 (1966) (as *Asparagus setaceus* (Kunth) Jessop).

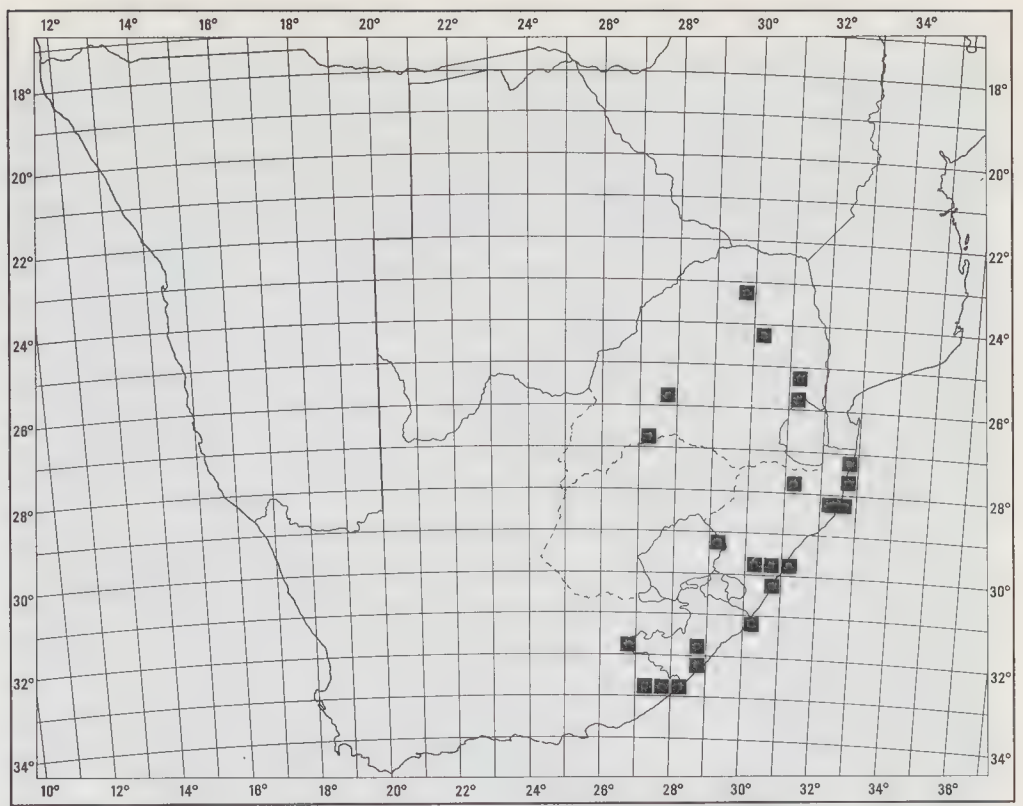
Scandent, evergreen perennial with branches, branchlets and cladodes spreading in one plane, attenuated to a point above, as side branches and branchlets decrease in size. *Rhizome* typical, with terete roots. *Stems* often stoloniferous; twining above. *Cladodes* ± 12 in compressed fascicles, spreading on both sides of branches and branchlets, terete, glabrous, shiny, dark green. *Flowers* apical, in centre of upper cladode fascicle, surrounded at base by a circle of small, membranous bracts; tepals narrowly oblong, ± 3 mm long, white; stalk 2–3 mm long, articulated near base. *Stamens* with thin filaments and yellow anthers. *Ovary* with ovules ± 6 in each locule; obovoid; style and stigmas short; *Berry* red, ± 4 mm in diameter, perianth persistent.

Recorded from eastern Cape, Natal and Transvaal; to tropical East Africa. Naturalized in Mauritius, tropical West Africa and elsewhere. Usually undergrowth in shade of forests, occasionally in open grassveld, frequently recorded from dune forest. Often found growing wild in gardens as birds distribute the berries. Cultivated for decorative purposes. Map 37.

Vouchers: Balsinhas 3189; Gerstner 6023; Pegler 345; Ross & Moll 2287; Spies 647; Strey 9843; Symons 40.

56. *Protasparagus nodulosus* Oberm., sp. nov. *P. setaceo affinis sed pubescens et caulibus versus basin nodulosus.*

Planta scandens caulibus minute tomentosis pilis albis erectis cladodibus tenuibus obscure viridibus, fundo caulis nodoso. Rhizoma lignosum durum radicibus teretibus. Caules infra umbonibus (bases veteres tumidae spinarum) furvis ± 4 mm diametro, spinae juniores exsertae breves acuminatae. Rami multi, erecto-patentes, obscure virides, pubescentes, ramulis



MAP 37.—*Protasparagus plumosus*

multis brevibus glabris cladodia tenuia graciles ± 5 mm longa in fasciculis semicircularibus crebris ferentibus. Flores baccasque non vidi.

Type: Transvaal, 2231 (Pafuri): (–AD), Kruger National Park, north-eastern corner, junction of Pafuri and Motala Rivers, Jeppe PRE 616449 (PRE, holo.).

Plant scandent. *Rhizome* woody, hard; roots terete. *Stems* minutely tomentose with erect, white hairs, knobbed below, the dark knobs (old swollen spine bases) ± 4 mm in diameter, younger spines exserted, short, sharp. *Branches* numerous, spreading-erect, pubescent, dull green; branchlets numerous, short, glabrous. *Cladodes* fine, thin, ± 5 mm long, in dense semi-circular fascicles. *Flowers* and *berries* not seen.

Recorded from northern Transvaal, northern Namibia, northern Botswana and northern Cape; also from Zimbabwe and Zambia. Usually in woodland or bush, often near rivers. Map 38.

Vouchers: Banks 62; Biegel & Russell 3840; Guy 80/64; Loeb 255; Pole Evans 1459; Pole Evans 1691; Van Son TM 28668.

57. *Protasparagus microrhaphis* (Kunth) Oberm. in South African Journal of Botany 2: 243 (1983). Type: Cape Province, Queenstown, Drège 3534 (BOL, lecto!).

Asparagopsis microrhaphis Kunth: 83 (1850). *Asparagus microrhaphis* (Kunth) Bak.: 612 (1875); Bak.: 262 (1896); Jessop: 61 (1966).

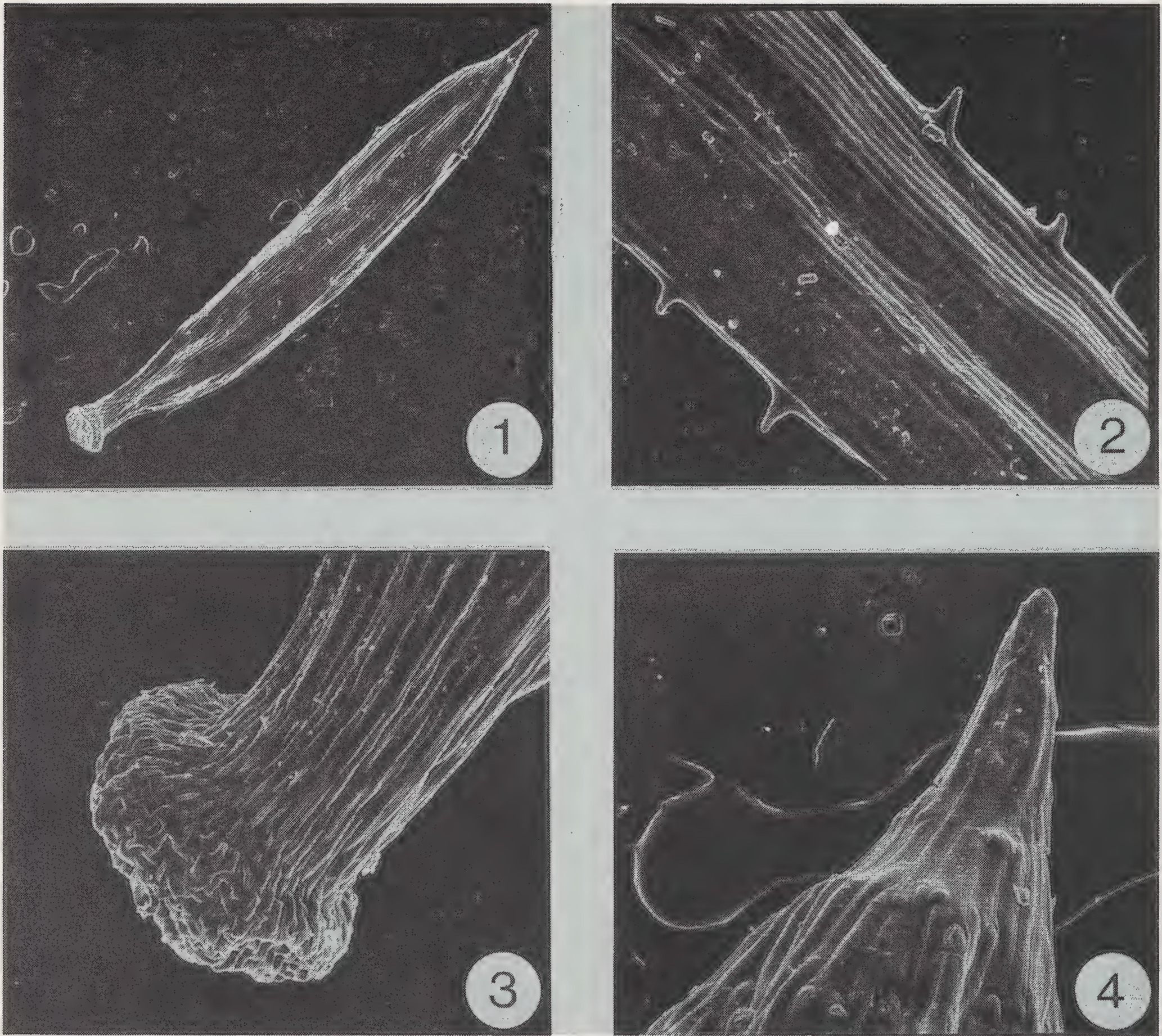


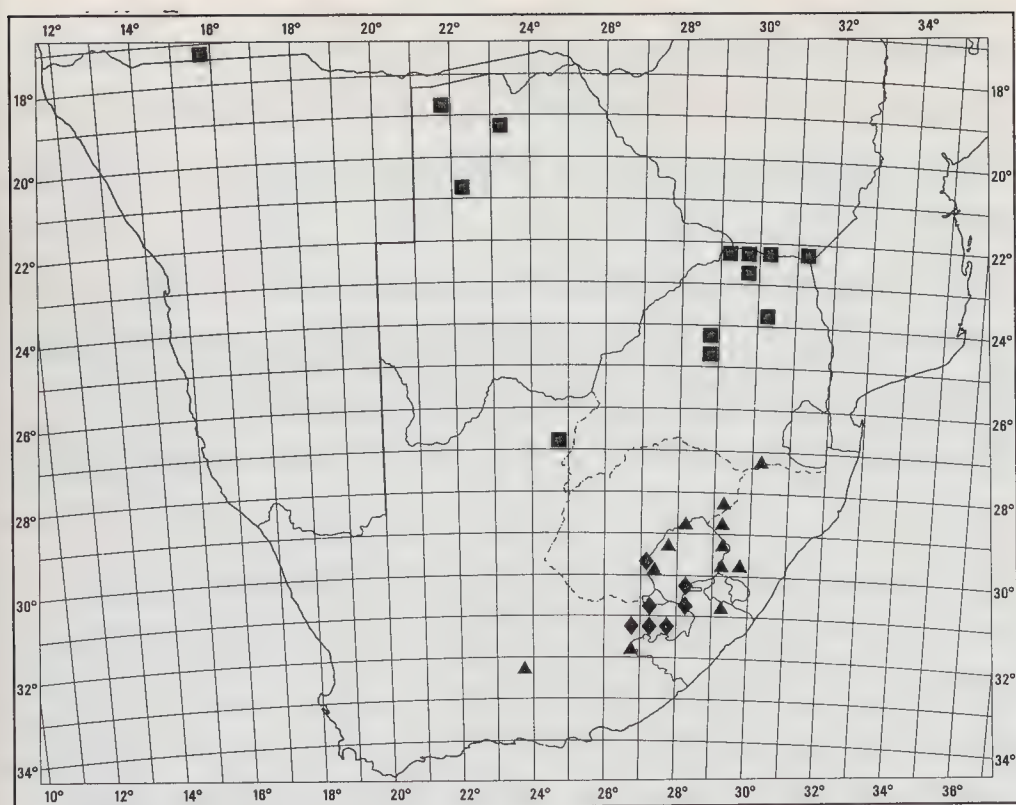
FIGURE 12.—*Protasparagus microrhaphis*: 1, cladode, $\times 36$; 2, setae on cladode, $\times 120$; 3, base of cladode, $\times 240$; 4, apex of cladode, $\times 240$ (after Bruce 369).

Dome-shaped shrub ± 1 m high, evergreen. *Rhizome* typical with sharp cataphylls; roots cylindrical, woody. *Stems* erect, ribbed, pale grey. *Spines* exserted, thin, sharp, ± 4 mm long, reduced to absent above. *Branches* spreading, bearing numerous branchlets covered by cladode fascicles. *Cladodes* numerous in each fascicle, glabrous or rarely with a few apical setae, cylindrical, ± 2 –4 mm long, apiculate, narrowed at base into an obtuse disc, together with the others of the fascicle placed on a pale, circular receptacle (Figure 12). *Flowers* solitary, pendulous,

placed beside a cladode fascicle; perianth with tepals ± 4 mm long, cream with a salmon or green centre stripe; flower stalk with disc near base. *Stamens* fairly long. *Ovary* with 6–8 ovules in each locule; ovoid; style short with 3 short spreading stigmas. *Berry* ± 7 mm in diameter, orange. Figure 8.

Recorded from south-eastern Transvaal, O.F.S., Natal, Lesotho and eastern Cape; montane, in humid rocky places and mountain slopes. Map 38.

Vouchers: *Devenish* 1844; *Devenish* 1846; *Galpin* 2169; *Schmitz* 8336; *Symons* 38; *Trauseld* 857.



MAP 38. — ■ *Protasparagus nodulosus*
 ▲ *P. microrhaphis*
 ◆ *P. stellatus*

58. *Protasparagus stellatus* (Bak.) Oberm., comb. nov.

Asparagus stellatus Bak.: 612 (1875). Types: Cape Province, 'Albert Div.', Cooper 622 (K, syn., PRE, photo.); Cape Province, Aliwal North, Witteberge, Drège 8589 (K, syn., PRE, photo.).

A. microrhaphis auct. non (Kunth) Oberm.: Jessop: 61 (1966).

Shrublets up to 2,5 m high, evergreen. *Rhizome* and roots not seen. *Stems* erect, ribbed, minutely pubescent, pale to dark grey with age. *Spines* thin, sharp, ± 6 mm long, recurved, absent above. *Branches* bearing numerous branchlets closely beset with rounded cladode fascicles. *Cladodes* obovoid, with some setae, ± 1 mm long, apiculate above, narrowed into a flat disc; together with other cladodes of the fascicle placed on a circular receptacle. *Flowers* solitary, pendulous, beside a cladode fascicle; tepals ± 4 mm long; flower stalk with disc near base. *Stamens* typical. *Ovary* with ± 10 ovules in each locule; ovoid. *Berry* not seen.

Recorded from Lesotho and eastern Cape; montane, in rocky places and on mountain slopes. Map 38.

Vouchers: Dieterlen 1374; Hilliard & Burt 6728; Müller 707; Staples 36; Stretton 65.

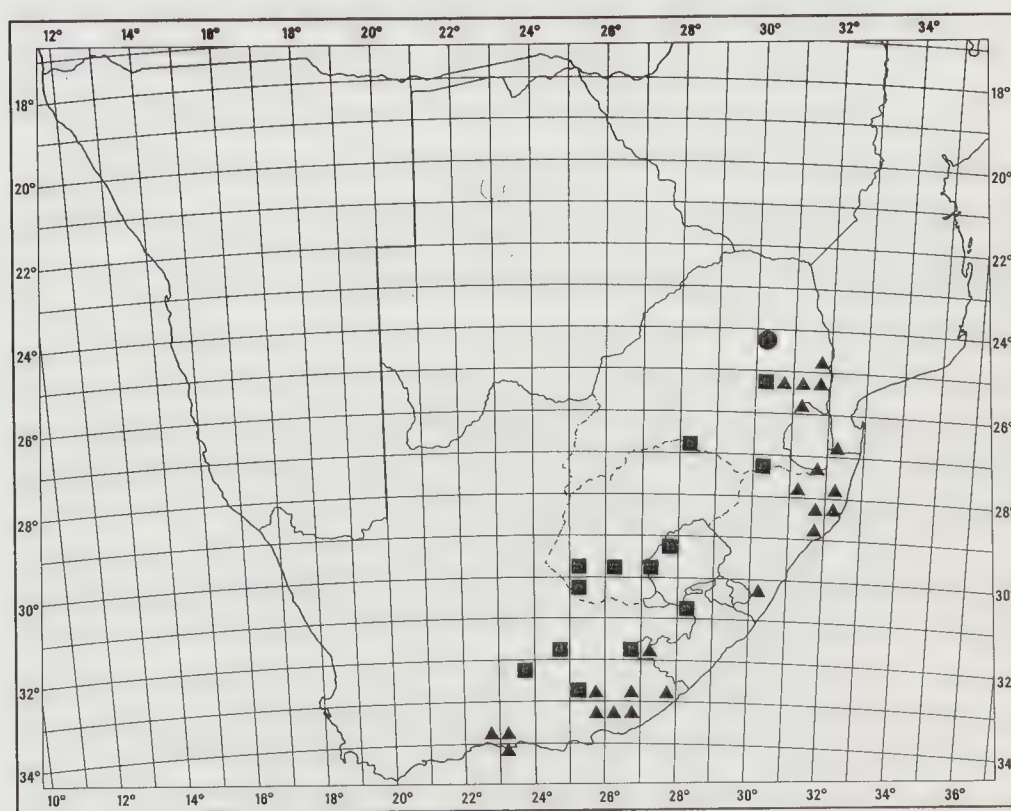
59. *Protasparagus concinnus* (Bak.) Oberm. & Immelman, comb. et stat. nov. Type: Cape Province, Pearston, lower part of Bruintjies Hoogte, Burchell 3020 (K, holo.; PRE, photo.).

Asparagus africanus Lam. var. *concinnus* Bak.: 619 (1875). *A. concinnus* (Bak.) Kies: 178 (1951b).

Small shrub up to 1 m high, erect stems from a hard rhizome. *Stems* clearly ribbed, minutely pubescent or glabrous, with recurved spines up to ± 5 mm long along whole length. *Branches* single from nodes, usually shallowly zigzagging, with short spines; branchlets multinoded, bearing numerous cladode fascicles. *Cladodes* appear to be perennial, fascicles each with (8–)12–16 cladodes, these more or less equal in length, 4–9 mm long, triangular in cross section. *Flowers* inside cladode fascicles, 1 or 2(3) per fascicle; tepals ± 3 mm long, creamy white; stalks recurved, articulated in lower part, 4–6 mm long. *Stamens* with linear filaments, colour not recorded. *Berry* ± 6 mm in diameter, red. Figure 8.

Southern Transvaal, Lesotho, south-western O.F.S. and eastern Cape; growing on hillsides in grassland. Map 39.

The original text for this species was either mislaid or never written, but it is quite clear from its inclusion in the key and from determinations on specimens that Obermeyer intended it to be published as a distinct species. This description has therefore been compiled from those specimens in PRE determined and labelled by her as *P. concinnus*. The



MAP 39. — ■ *Protasparagus concinnus*
 ▲ *P. macowanii*
 ● *P. fouriei*

distribution and voucher specimens have also been taken from these specimens. It is unfortunately not possible to know what synonymy and literature she intended to include under *P. concinnus*. The photograph of the type specimen is in PRE and therefore would certainly have been seen by her.

Vouchers: Bayer 4582; Bayer 4632; Devenish 1844; Drews 168; Kies 339.

60. **Protasparagus macowanii** (Bak.) Oberm. in South African Journal of Botany 2: 244 (1983). Type: Cape Province, Albany, Zeyher 879 (K, lecto.!; BOL, iso.).

Asparagus macowanii Bak.: 609 (1875); Jessop: 57 (1966).

A. zuluensis N.E. Br.: 283 (1912). *A. macowanii* Bak. var. *zuluensis* (N.E. Br.) Jessop: 58 (1966). Type: Natal, Zululand, Medley Wood 11969 (K, holo.; NH, iso.).

Erect, glabrous shrub 1–2 m high, seeking support when very tall. *Rhizome* woody with many swollen main roots clustered around it. *Stems* smooth with short recurved spines below, spines suppressed above. *Branches* 1–several from an enlarged node, spreading, bearing numerous short branchlets terminating in globose cladode fascicles (often from twin buds). *Cladodes* ± 50 in a fascicle, more or less equal in size, ± 15 mm long, deciduous, surrounded at base by 2 or 3 ovate, membranous bracts, pale green. *Flowers* profuse, in fascicles on young branches, usually appearing before cladodes are fully developed; tepals oblong, ± 3 mm long, white; stalk ± 5 mm long, articulated in lower half. *Stamens* with linear filaments and yellow anthers. *Ovary* with ± 4 ovules in each locule; attenuate below; style and stigmas short. *Berry* probably ± 12 mm in diameter.

Recorded from southern and eastern Cape, Natal (common in the Hlabisa district) and eastern Transvaal; also in Mozambique; near rivers or in shady moist places. Flowering September to November. Map 39.

Introduced into horticulture as it has good lasting qualities and is very attractive.

Vouchers: Dyer & Verdoorn 5832; Galpin 2504; Tyson 1878; Van der Schijff 3982; Venter 2142; Ward 4379.

61. **Protasparagus fouriei** Oberm., sp. nov. *P. sekukuniensis affinis sed erecta, cladodiis papillatis-costatis*.

Frutices erecti ad 1 m alti, caulibus cladodiisque minute papillato-costatis. Rhizoma typicum, radicibus lateralibus tuberiferis. Caules pauci erecti griseoli, spinis infra ramos ramulosque et fasciculos cladodiorum florumque. Rami satis breves, adscendentes, ramulis fasciculos cladodiorum ferentes. Cladodia erecta, in quoque fasciculo 2–6, filiformia 6-angulara $\pm 20 \times 1$ mm, subcurvata, costis papillatis. Flores in racemo composito nudo sine cladodiis, vel in ramulis infra fasciculis cladodiorum supra spinam plerumque 2 vel 3 in fasciculis divergentibus; tepala anguste oblonga, ± 5 mm longa, apice obtuso, breve dentata, exteriora recurvata; pedicello ± 2 mm longo, supra discoideo, ad fundum attenuatum discoideum perianthii affixo. Stamina basin versus tepalorum inserta, antheris grandis (1,5 mm) atropurpureis. Ovarium globosum, ovulis in quoque loculo 8; stylo breve stigmatibus 3 brevibus. Bacca ± 10 mm diametro, viridis vel rubra.

Type: Transvaal, 2430 (Pilgrim's Rest): (–AD), Penge, on a small dolomite hill (NW) in closed woodland, in gritty, sandy loam, Fourie 3114 (PRE, holo.).

Erect shrubs ± 1 m high; stems and cladodes minutely papillate-ribbed. *Rhizome* typical, side roots with tubers. *Stems* few, erect, greyish. *Spines* present below branches, branchlets, cladode fascicles and flower fascicles. *Branches* fairly short, ascending; branchlets bearing cladode fascicles. *Cladodes* erect, 2–6 in a fascicle, 6-angled, $\pm 20 \times 1$ mm, somewhat curved. *Flowers* white, in a compound, bare raceme without cladodes, or placed along branchlets below cladode fascicle and above spine, usually 2 or 3 in divergent fascicles; tepals narrowly oblong, ± 5 mm long, apex obtuse, shallowly dentate, outer tepals recurved; pedicel ± 2 mm long, discoid above, attached to attenuate discoid base of perianth. *Stamens* attached to tepals below, bearing large (1,5 mm) dark purple anthers. *Ovary* with 8 ovules in each locule; globose; style short with 3 short stigmas. *Berry* with 4 ovules in each locule, ± 10 mm in diameter, green to red.

Recorded from dolomite koppies near Penge Mine (eastern Transvaal); in mixed bushveld. Map 39.

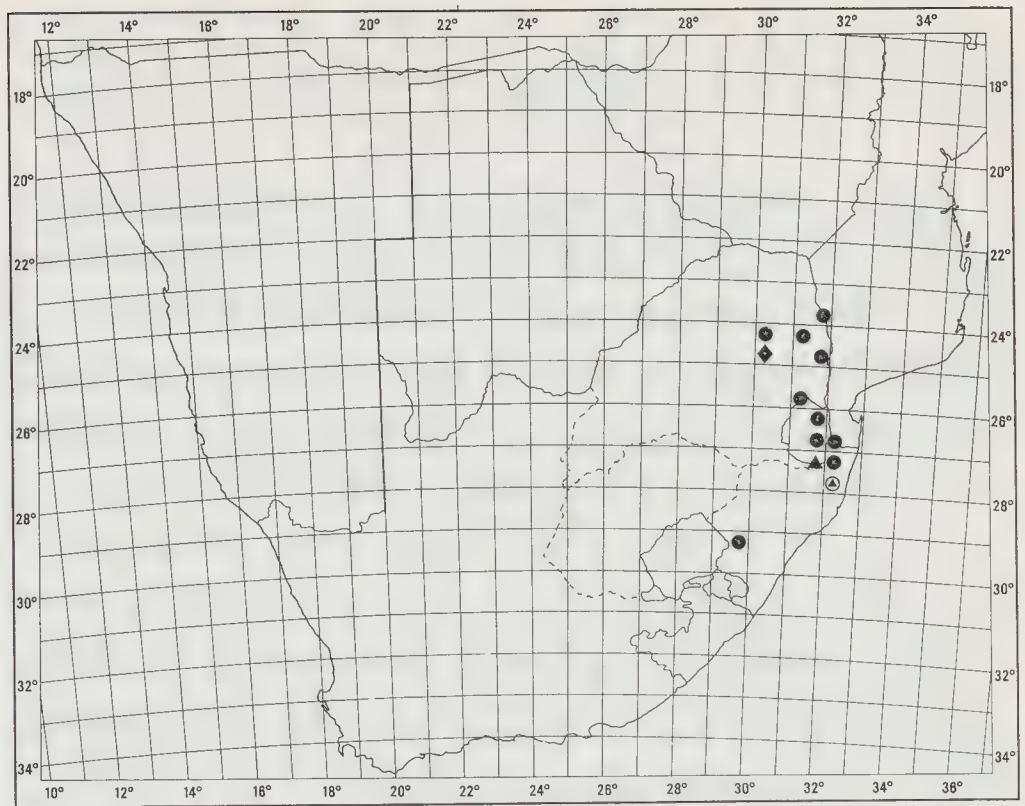
Vouchers: *Codd 10569*; *Fourie 3/20*; *Fourie 3100*.

62. *Protasparagus sekukuniensis* Oberm., sp. nov. *P. fouriei* affinis sed scandens, cladodisque glabris.

Planta scandens ad 2 m alta. Rhizoma radicesque non vidi. Caules subfractiflexi, copiose ramificantes, glabri costati. Spinae (saltem veteres inferiores) recurvatae latae breves. Rami ramulique laxe fractiflexi, cladodia erecta, spina parva subtenta ferentes. Cladodia in quoque fasciculo 3–4, glabra plus minusve erecta, filiformia, ± 25 – 30 mm longa, laevia. Racemi (rami mutati), 50 – 60 mm longi crebri ramulis sursum curvatis fasciculos florum ferentibus, bracteis membranaceis infra in spinam parvam terminantibus subtentis. Perianthium tepalis oblongis ± 3 mm longis apice obtuso breve eroso. Stamina antheris linearibus flavis ± 1 mm longis. Ovarium globosum, ovulis in quoque loculo 4; in stylum brevem stigmaque obtusum 3-lobatum attenuatum. Bacca 10 mm diametro, rubra.

Type: Transvaal, 2430 (Pilgrim's Rest): (–CA), Driekop, farm Driekop, on lower hills of Lulu mountains, on rosite rocks, *Mogg & Barnard 602b* (PRE, holo.); *Barnard 201* (PRE).

Scandent, up to 2 m high. Rhizome and roots not seen. Stems somewhat zigzagging, branching freely, glabrous, ribbed. Spines (viz. older ones below), recurved, broad, short. Branches and branchlets laxly zigzagging, bearing erect cladodes subtended by a small spine. Cladodes in fascicles of 3 or 4, glabrous, more or less erect, filiform, ± 25 – 30 mm long. Racemes (modified branches) 50 – 80 mm long, dense, with numerous upcurved side branchlets bearing flower clusters, subtended by membranous bracts ending in a small spine below. Perianth with tepals ± 3 mm long, apex obtuse and shallowly erose. Stamens with linear yellow anthers ± 1 mm long. Ovary with ovules 4 in each cell; globose; attenuated into a short style and obtuse, 3-lobed stigma. Berry ± 10 mm in diameter, red.



MAP 40. — ♦ *Protasparagus sekukuniensis*
▲ and △ *P. biflorus*
● and ○ *P. minutiflorus*

Known from only one locality, where it was recorded as frequent, by *W.G. Barnard 201*, on the farm Driekop, on the lower hills of the Lulu Mountains (eastern Transvaal). Used medicinally by the local population. Map 40.

Related to *P. fouriei* (no. 61) but scandent and the cladodes with a smooth epidermis. It produces a similar type of inflorescence in which a side branch has been converted into a compound flower cluster.

Vouchers: types only.

63. *Protasparagus biflorus* Oberm., sp. nov. a *P. minutifloro* floribus geminatis pedunculatis differt.

Frutices erecti non spinosi habitu 'caudae vulpinae', ad $\pm 0,45$ m alti 45 mm lati. Rhizoma et radices non vidi. Caulis ramis crebris brevibus ± 10 – 20 mm longis ad angulum 90° patentibus in fasciculo globoso cladodiorum terminantibus. Cladodia in quoque fasciculo ± 50 vel ultra, filiformes, usque ad 15 mm longa, laete viridia, in disco basali parvo superposita. Flores geminati intra 'caudam vulpinam' tecti, ad nodos juxta ramos ramulosque; perianthium fortasse campaniforme, tepalis 2 mm longis albis; pedunculo 1,5–3 mm longo, pedicellis geminis ± 1 mm longis, uterque bractea elongata triangulari tecta. Stamina typica antheris flavis. Ovarium ovulis aliquot in quoque loculo; ovoideum; stylo breve. Bacca ± 5 mm diametro.

Type: Natal, 2732 (Ubombo): (—CB), Mkuzi Game Reserve, *Gerstner* 4597 (PRE, holo.).

Erect, spineless shrubs of 'fox-tail habit', up to 0,45 m high and 45 mm wide. *Rhizome* and *roots* not seen. *Stems* with branches placed close together, short, ± 10 –20 mm long, spreading at right angles from stem, terminating in a globose cladode fascicle. *Cladodes* ± 50 or more in each fascicle, filiform, up to 15 mm long, pale green, placed on a small, basal disc. *Flowers* in pairs hidden inside 'fox-tail' at nodes, beside branches and branchlets; perianth possibly bell-shaped; tepals 2 mm long, white; peduncle 1,5–3,0 mm long; twin pedicels ± 1 mm long, each covered by an elongate, triangular bract. *Stamens* typical, anthers yellow. *Ovary* ovoid; style short; ovules several per locule. *Berry* ± 5 mm in diameter.

Recorded from northern Zululand and southern Swaziland; on mountain slopes in dry bushveld. Flowering in spring. Map 40.

This species is related to *P. minutiflorus* (no. 64) but the twin flowers, placed on a peduncle, are an unusual character. Like *P. stellatus* (no. 58), *P. microrhaphis* (no. 57) and *P. mucronatus* (no. 25), the base of the cladode forms a flat disc which is placed on a semiglobose, white, apical torus. These apical knobs are very characteristic on the old, bare branches.

Vouchers: *Bayliss* 3449; *Gerstner* 4597; *Prosser* 1972.

64. *Protasparagus minutiflorus* (Kunth) Oberm. in South African Journal of Botany 2: 244 (1983). Type: Mozambique, Delagoa Bay, *Forbes s.n.* (B, holo.; PRE, photo!).

Asparagopsis minutiflora Kunth: 89 (1850). *Asparagus minutiflorus* (Kunth) Bak.: 616 (1875); Bak.: 263 (1896); Jessop: 63 (1966).

Erect shrubs of 'fox-tail' habit, $\pm 0,3$ –0,5 m high, with stems, branches and cladodes bearing scabrid ridges. *Rhizome* producing several stems, woody, with long, spreading roots forming lateral, globose tubers. *Stems* enveloped by short, ascending branches and branchlets. *Spines* exserted, often curved upwards, variable in size, up to ± 8 mm long. *Cladodes* ± 10 in a fascicle, stellately arranged, thin, filiform, 3-angled, up to 10 mm long, apiculate, base obtuse. *Flowers* solitary or binate, borne along branches and branchlets at or near stem; tepals ± 2 mm long,

white; stalk ± 2 mm long, disc near base. *Stamens* with orange or yellow anthers. *Ovary* ± 1 mm long; with a short style; ± 4 ovules in each locule. *Berry* ± 7 mm in diameter, red.

Recorded from eastern Transvaal, Swaziland, Natal and Zululand; also from southern Mozambique; in mopane veld, open thorn bushveld, and on stony hillsides. Map 40.

Vouchers: *Codd* 10296; *Codd & Dyer* 4694; *Compton* 30940; *Nel* 5524; *Pooley* 1486; *Thorncroft* 3006b; *Ward* 4529.

65. *Protasparagus rigidus* (Jessop) Oberm. in South African Journal of Botany 2: 244 (1983). Type: Transvaal, Mariepskop, *Killick & Strey* 2380 (PRE, holo!).

Asparagus rigidus Jessop: 64 (1966).

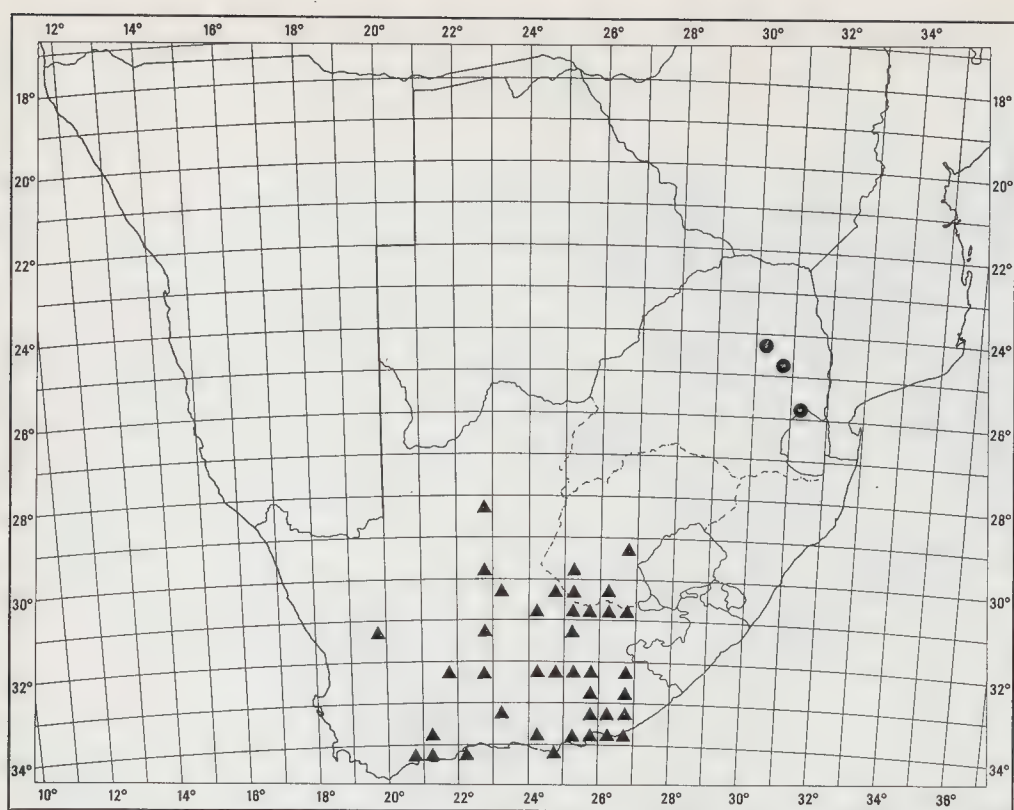
Erect, dense shrubs with 'fox-tail' habit, $\pm 0,5$ m high, bearing coarse, prickly, dark green cladodes. *Rhizome* typical; main roots with tuberous swellings near rhizome. *Spines* minute. *Branches* short, ascending, overlapping, with branchlets strongly ridged, somewhat zigzagging. *Cladodes* usually in clusters of 3, the apical cluster of ± 6 cladodes, divaricate, stellate (Figure 13), sharply 3-ribbed, straight, ± 10 mm long, ribs with prominent, large cells, apex pungent and brown, base broad and flat. *Flowers* on short peduncles, in clusters of 3, rarely in clusters of 5 or 6, with dark small bracts below; tepals oblong, ± 4 mm long; stalk articulated in lower half. *Stamens* with yellow anthers. *Ovary* with ± 3 or 4 ovules in each locule; obovoid. *Berry* ± 8 mm in diameter, red.

Recorded from eastern Transvaal; montane, in rocky ledges. Flowering in November. Map 41.

Vouchers: *Codd & De Winter* 3313; *Fourie* 931; *Kluge* 1875; *McNeil* PRE 36485; *Rogers* 21982; *Van der Schijff* 5589.

66. *Protasparagus striatus* (L.f.) Oberm. in South African Journal of Botany 2: 244 (1983). Type: Cape of Good Hope, without precise locality, *Thunberg s.n.* (UPS, no. 8463, holo.; PRE, photo!).

Dracaena striata L.f.: 204 (1781); Roem. & Schult.: 346 (1829) as *D. stricta*. *Asparagus striatus* (L.f.) Thunb.: 65 (1794); Bak.: 621 (1875); Bak.: 267 (1896); Jessop: 76 (1966). *Myrsiphyllum striatum* (L.f.) Kunth: 110 (1850).



MAP 41. — ● *Protasparagus rigidus*
▲ *P. striatus*

D. erecta L.f.: 204 (1781); Roem. & Schult.: 346 (1829). *Asparagus erectus* (L.f.) Thunb.: 65 (1794); Bak.: 621 (1875); Bak.: 267 (1896). *M. erectum* (L.f.) Kunth: 109 (1850). Syntypes: Cape of Good Hope, without precise locality, *Thunberg s.n.* (UPS, nos. 8444, 8445, holo.; PRE, photos!).

A. striatus var. *linearifolius* Bak.: 622 (1875); Bak.: 268 (1896). Syntypes: Cap. bon. spei, *Thunberg s.n.*; *Burchell 1570*; *Zeyher 480*; *Ecklon, Smilac. No. 6*; *Drège 8465a*; *Bolus 576*.

A. striatus var. *dregei* Bak.: 622 (1875); Bak.: 268 (1896). Type: Cap. bon. spei, *Drège 8565*.

A. striatus var. *zeyheri* Bak.: 268 (1896). Type: Cape Province, Uitenhage div., *Zeyher, Asparagus No. 6*.

A. engleri Krause: 450 (1914). Type: Namibia, Great Karas-berg, *Engler 6651* (B, holo.; PRE, photo!).

Erect, xerophytic, stiff, branched, glabrous or minutely papillose green shrublets, $\pm 0,3-0,6$ m high. *Rhizome* typical; root system extensive, lateral root tubers may be present (Figure 9). *Stems* hard, with short branches and branchlets, minutely striate. *Spines* poorly developed. *Branches* ascending, straight or laxly zigzagging. *Cladodes* borne on abbreviated branchlets (Figure 13), solitary, linear, $\pm 30-40 \times 2-5$ mm, but variable in size, acute, striate, hard. *Flowers* few to many, in sessile apical fascicles subtended by small, hard, brown, acute bracts at base; tepals delicate, ± 4 mm long, white, persistent; stalks ± 5 mm long, articulated in lower half. *Stamens* typical. *Ovary* with ± 10 ovules

in each locule; oblong. *Berry* 1- or 2-seeded, globose, ± 5 mm in diameter, orange or red.

Occurs in southern, eastern and northern Cape, Karoo and western O.F.S.; inhabiting dry karroid areas, often in rocky niches. Flowering October to December. Map 41.

Vouchers: *Bayliss 2573*; *Ecklon 6*; *Galpin 7374*; *Herman 478*; *Jessop 644*; *Mauve 5433*; *Roberts 5381*; *Van Breda 28*; *Verdoorn H2371*; *Zeyher 480*.

67. *Protasparagus subulatus* (Thunb.) Oberm. in South African Journal of Botany 2: 243 (1983). Type: Cape of Good Hope, without precise locality, *Thunberg s.n.* (UPS Nos. 8464 holo.; BOL!, PRE!, photos).

Asparagus subulatus Thunb.: 66 (1794); Thunb.: 333 (1823); Willd.: 154 (1799); Roem. & Schult.: 326 (1829); Kunth: 74 (1850); Bak.: 612 (1875); Bak.: 262 (1896); Jessop: 78 (1966).

Shrubby or scandent up to 2 m high, with zigzagging branches and branchlets. *Rhizome* typical, woody. *Roots* terete, long, thick, with fusiform tubers ± 20 mm long placed along them. *Stems* erect, minutely grooved, hard, with small, appressed spines below. *Branches* thin, spineless, somewhat zigzagging; branchlets short, zigzagging and widely divergent, fairly similar in length, ending in 2 opposite cladode fascicles. *Cladodes* $\pm 3-6$ in the fascicle (Figure 13), filiform, thin, ± 15 mm long. *Flowers* placed inside cladode fascicles, shorter than cladodes, surrounded at base by minute bracts; tepals broadly linear, ± 2 mm long, yellowish green; stalk $\pm 1-2$ mm long, articulated near base. *Stamens* typical. *Ovary* with 2 ovules in each locule. *Berry* 1-3-seeded, globose, ± 5 mm in diameter, orange.

Restricted to eastern Cape; in dry fynbos or Fish River scrub. Map 42.

Vouchers: *Acocks 11893*; *Bayliss 2606*; *Britten 1875*; *Dyer 1082*; *Friis, Norlindh & Weimarck 956*; *Galpin 2923*; *Jessop 608*; *Jessop 610*; *Thode A 2768*; *Zeyher 250*.

68. *Protasparagus intricatus* Oberm., sp. nov. *P. divaricato affinis sed cladodiis brevioribus fasciculisque florum cladodia superantibus.*

Frutices rigidi erecti compacti perennes $\pm 0,6$ m alti, valde fractiflexi internodiis brevibus,

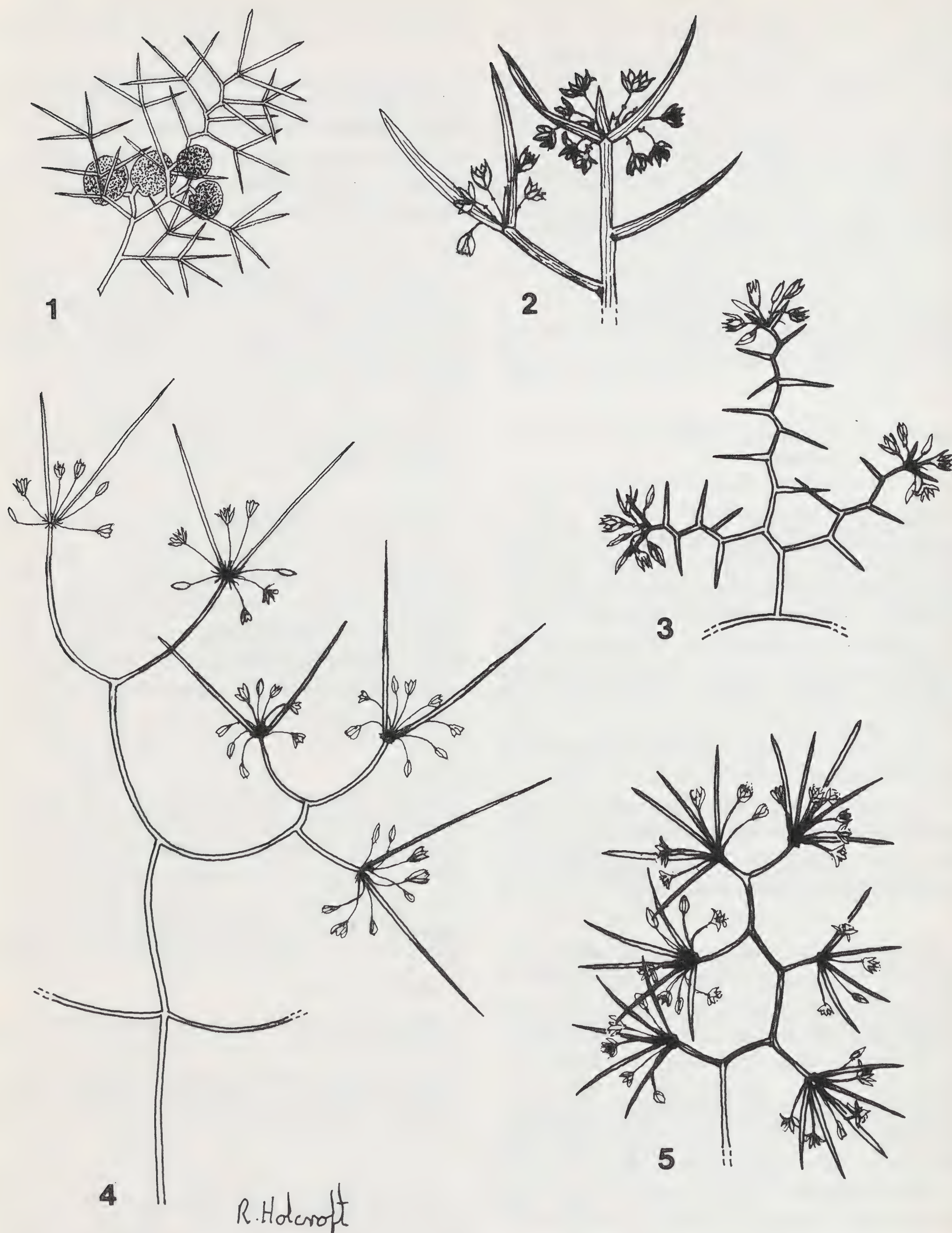
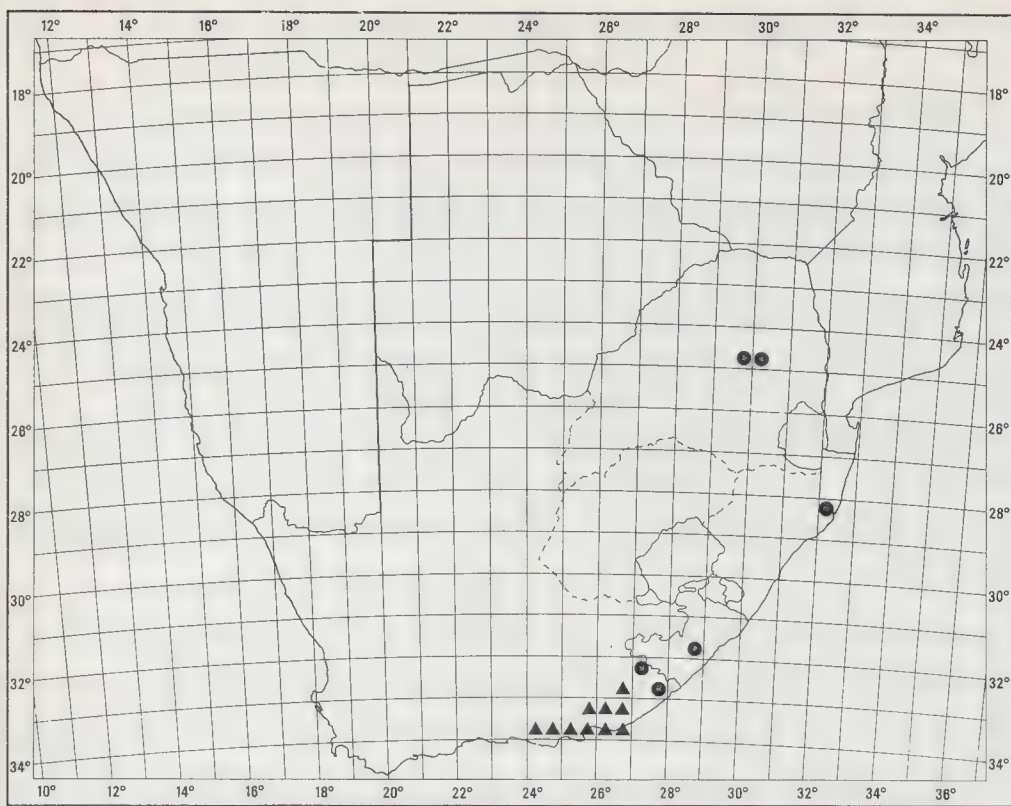


FIGURE 13.—Species showing stellate pattern of cladode fascicles: 1, *Protasparagus rigidus*, $\times 0,5$ (after *Van der Schijff* 5589); 2, *P. striatus*, $\times 0,5$ (after *Van Breda* 28); 3, *P. intricatus*, $\times 1$ (after *Flanagan* 1293); 4, *P. divaricatus*, $\times 1$ (after *Gerstner* 2825); 5, *P. subulatus*, $\times 1$ (after *Dyer* 1082). Artist: R. Holcroft.



MAP 42. — ▲ *Protasparagus subulatus*
● *P. intricatus*

cladodiis teretibus pungentibus, glabris vel minute pubescentibus. Rhizoma radicesque non vidi. Caules rami et ramuli corpus densum formantes; cladodiis solitariis alternis divaricatis spinosis ± 10 mm longis. Flores pauci vel plures fasciculo apicale brevioris quam cladodiis 3 cingentis; perianthium typicum; tepalis 4 mm longis albis; pedicello ± 4 mm longo, basin versus disco, bracteis minutis circumcincto. Bacca ± 5 mm diametro.

Type: Cape, 3227 (Stutterheim): (–DB), near Komga, Flanagan 1293 (PRE, holo.).

Rigid, erect, dense, compact, perennial shrubs $\pm 0,6$ m high, strongly zigzagging with short internodes, glabrous or minutely pubescent. *Rhizome* and roots not seen. *Cladodes* solitary, paired at stem apices, alternate, divaricate, spinous, ± 10 mm long (Figure 13). *Flowers* few to several, in an apical fascicle, shorter than the 3 surrounding cladodes; perianth typical, tepals ± 4 mm long, white; stalk ± 4 mm long, surrounded by minute bracts, disc near base. *Berry* ± 5 mm in diameter.

Recorded from eastern Transvaal, northern Natal and, disjunctly, from Transkei and eastern Cape as far south as Komga; on dry rocky hills. Map 42.

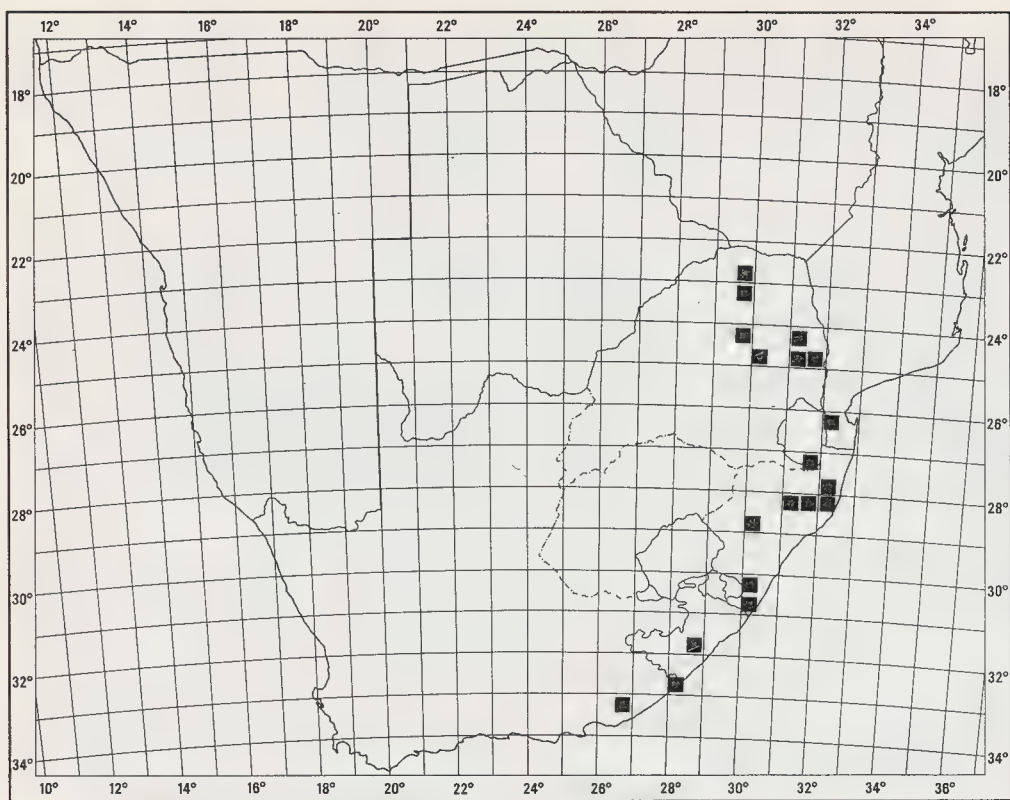
Vouchers: Acocks 12158; Adkins sub Galpin 3114; Adkins sub Galpin 8324; Barnard & Mogg 602A; Flanagan 1293; Mauve PRE 36299; Mogg 16890.

69. *Protasparagus divaricatus* Oberm., sp. nov. *P. intricato affinis sed cladodiis longioribus, fasciculisque florum cladodibus brevioribus.*

Frutices erecti vel scandentes glabri griseo-viridi, intricate ramosi, 0,5–1,5 m alti, ramulis longis tenuibus divergentibus. Rhizoma parvum lignosum. Radices tuberibus fusiformibus in radicibus lateralibus prope rhizoma. Caulis erectus ± 3 mm diametro, spinis crebris parvis retrorsis squamam superiorem triangularem appressam habentibus. Rami et ramuli sympodioides in cladodiis 1–3 terminantes. Cladodia solitaria vel binata ad extrema caulium, filiformia, ± 30 –40 mm longa, rigida apiculata. Flores fasciculo compacto 6–20 florum in nodo superiore, inter par cladodiorum divergentium valde fasciculos florum excedentium 'atromalvacei, demum pallentes' (fide Ward 4760 in PRE); tepala late linearia, ± 4 mm longa; pedicello 5–6 mm longo, infra medium articulato. Stamina typica. Ovarium ovulis in quoque loculo ± 4 ; anguste ovoideum, attenuatum ad basin et supra ad stylum longum, stigmatum tumido apicale. Baccae ± 5 mm diametro, flavae dum maturae (fide Strey 7457).

Type: Natal, 2831 (Nkandla): (–AD), Mahlabatini, Gerstner 2825 (PRE, holo.).

Erect or scandent shrubs, glabrous, greyish green, intricately branched, 0,5–1,5 m high, with long thin divergent branchlets. *Rhizome* small, woody. *Roots* with fusiform tubers on side roots near rhizome. *Stem* erect, ± 3 mm in diameter, closely beset with small, retrorse spines with a triangular, appressed upper scale. *Branches* and *branchlets* sympodioid, terminating in 1–3 cladodes. *Cladodes* solitary, paired at stem apices, filiform, ± 30 –40 mm long, stiff, apiculate (Figure 13). *Flowers* in a compact fascicle of 6–20 in upper node, flanked by 2 divergent cladodes which much exceed flower fascicles, 'deep mauve, paling later' (fide Ward 4760 in PRE); tepals broadly linear, ± 4 mm long; stalk 5–6 mm long, articulated in lower half. *Stamens* typical. *Ovary* with ± 4 ovules in each locule; narrowly ovoid, attenuated below and above into a long style; stigma apical, swollen. *Berries* ± 5 mm in diameter, yellow when ripe (fide Strey 7457 in PRE).



MAP 43.—*Protasparagus divaricatus*

Occurs in eastern Cape, Natal, Zululand, Swaziland, eastern Transvaal and probably further north; widespread and common in dry bushveld areas, usually in rocky niches. Flowering from October to December. Map 43.

Vouchers: *Acocks 10971*; *Codd 5718*; *Culverwell 1105*; *Gerstner 2825*; *Jacobsen 1876*; *Strey 7457*.

Species insufficiently known

Asparagopsis juniperina Kunth, Enumeratio plantarum 5: 85 (1850). Type: Bergius (BM). Given as a synonym of *Asparagus africanus* in Jessop: 48 (1966). In a copy of Jessop marked by Mauve, she queries if this is = *P. multiflorus*.

Asparagus denudatus var. *fragilis* Bak. in Flora capensis 6: 258 (1896). Type: Sneeuwberg Range, 3 500 ft., Bolus 791.

Asparagus pilosus Bak. in Journal of the Linnean Society of London, Botany 14: 610 (1875). *Asparagopsis pilosa* (Bak.) Oberm.: 244 (1983). Type: Botswana, Lake Ngami, MacCabe.

Asparagus planiusculus Burm. f., Prodrum florum capensis: 10 (1768). No specimen which could typify this name has been traced in G-Burman (fide D.O. Wijnands in litt.).

Asparagus undulatus var. *rugosus* Bak. in Journal of the Linnean Society of London, Botany 14: 629 (1875). Type: Cap. bon spei, Oldenburg (BM).

Excluded species (other than those now placed in *Myrsiphyllum*)

Asparagus cuscutoides Burch. ex Bak.: 606 (1875) = *Schizobasis cuscutoides* (Burch. ex Bak.) Benth.

Asparagus nodosus Soland. ex Bak.: 608 (1875); Bak.: 260 (1896) = *Adenogramma teretifolia* (Thunb.) Adams. (Aizoaceae).

REFERENCES

- ARBER, A. 1924. *Myrsiphyllum* and *Asparagus*: a morphological study. *Annals of Botany* 38: 635–659.
- BAKER, J.G. 1870. In W.W. Saunders, *Refugium botanicum* 3: t. 214. Van Voorst, London.
- BAKER, J.G. 1871. *Asparagus aethiopicus* var. *ternifolius*. In W.W. Saunders, *Refugium botanicum* 4: t. 261. Van Voorst, London.
- BAKER, J.G. 1874. New garden plants: *Asparagus* (*Asparagopsis*) *cooperi* Baker. *Gardeners' Chronicle* 1: 818.
- BAKER, J.G. 1875. Revision of the genera and species of Asparagaceae. *Journal of the Linnean Society of London, Botany* 14: 594–631.
- BAKER, J.G. 1889. New petaloid monocotyledons from Cape Colony. *Journal of Botany, London* 1889: 42–43.
- BAKER, J.G. 1893. Decades kewenses — Decas VI. *Kew Bulletin* 1893: 209–212.
- BAKER, J.G. 1896. *Asparagus*. In W.T. Thiselton-Dyer, *Flora capensis* 6: 256–274. Reeve, London.
- BAKER, J.G. 1898. *Asparagus*. In W.T. Thiselton-Dyer, *Flora of tropical Africa* 7: 425–436. Reeve, London.
- BAKER, J.G. 1904. Beiträge zur Kenntnis der afrikanischen Flora XVII. *Vierteljahrschrift der Naturforschenden Gesellschaft in Zürich* 49: 176.
- BARNHART, J.H. 1965. *Biographical notes upon botanists* 1: 248. Hall, Boston.
- BENTHAM, G. & HOOKER, J.D. 1883. *Genera plantarum* 3. Reeve, London.
- BERGIUS, P.J. 1767. *Descriptiones plantarum ex Capite Bonae Spei*. Salvius, Stockholm.
- BOLUS, H., BOLUS, L. & GLOVER, R. 1915. Flowering plants and ferns collected on the Great Karasberg by the Percy Sladen Memorial Expedition, 1912 – 1913. *Annals of the Bolus Herbarium of the South African College* 1: 97–114.
- BRESLER, M. 1826. *Generis Asparagi historia naturalis. Dissertio inauguralis*: i–x, 1–46. Berlin.
- BROWN, N.E. 1912. Diagnoses africanae XLIV. *Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew* 1912: 270–283.
- BROWN, N.E. 1921. New plants from tropical and South Africa collected by Archdeacon F.A. Rogers. *Kew Bulletin* 1921: 289–301.
- BURCHELL, W. J. 1822. *Travels in the interior of southern Africa* 1. Longman, London.
- BURCHELL, W. J. 1824. *Travels in the interior of southern Africa* 2. Longman, London.
- BURMAN, N.L. 1768. *Prodrum florum capensis* in *Flora indica*. Haak, Leiden.
- COONEY-SOVETTS, C. & SATTLER, R. 1986. Phylloclade development in the Asparagaceae: an example of homeosis. *Botanical Journal of the Linnean Society* 94: 327–371.
- DAHLGREN, R.M.T., CLIFFORD, H.T. & YEO, R.F. 1985. *The families of the monocotyledons: structure, evolution and taxonomy*. Springer, Berlin.

- DE WILDEMAN, E. 1913. Decades novarum specierum florae katangensis XII–XIV. *Repertorium novarum specierum regni vegetabilis* 12: 281–298.
- DINTER, K. 1931. Diagnosen neuer südwestafrikanischer Pflanzen 39. *Repertorium novarum specierum regni vegetabilis* 29: 253–272.
- DRÈGE, J.F. 1847. Vergleichen der von Ecklon und Zeyher und von Drège gesammelten südafrikanischen Pflanzen. *Linnaea* 20: 183–258.
- DYER, R.A. 1976. *The genera of southern African flowering plants* 2. Department of Agricultural Technical Services, Pretoria.
- ECKLON, C.F. 1830. A list of plants found in the district of Uitenhage, between the months of July, 1829, and February, 1830, together with a description of some new species. *South African Quarterly Journal* 1: 363.
- ENGLER, H.G.A. 1892. *Über die Hochgebirgsflora des tropischen Afrika*. Verlag der Königl. Akademie der Wissenschaften, Berlin.
- ENGLER, H.G.A. 1903. Liliaceae africanae II. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 32: 89–97.
- ENGLER, H.G.A. & KRAUSE, K. 1910. Liliaceae africanae II. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 45: 123–155.
- HOOKE, J.D. 1900. *Asparagus ternifolius*. *Curtis's Botanical Magazine* 126: t. 7728.
- HUTCHINSON, J. 1959. *The families of flowering plants II: Monocotyledons*, edn 2. Clarendon, Oxford.
- JACQUIN, N.J. 1798. *Plantarum rariorum horti caesarei schoenbrunnensis descriptiones et icones* 3. Wappler, Vienna.
- JESSOP, J. 1966. The genus *Asparagus* in southern Africa. *Bothalia* 9: 31–96.
- KIES, P. 1951a. Newly described species. *Bothalia* 6: 213–238.
- KIES, P. 1951b. Notes on *Asparagus africanus* and related species. *Bothalia* 6: 177–181.
- KRAUSE, K. 1914. Liliaceae africanae V. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 51: 440–450.
- KRAUSE, K. 1930. *Asparagus*. *Die natürlichen Pflanzenfamilien*, edn 2, 15a: 362–365, Figs 148–150.
- KUNTH, C.S. 1842. Über die natürliche Gruppe der Liliaceen im weitesten Sinne des Worts. *Physikalische Abhandlungen der K. Akademie der Wissenschaften zu Berlin* 1–55.
- KUNTH, C.S. 1850. *Enumeratio plantarum* 5. Cotta, Stuttgart & Tübingen.
- KUNTZE, O. 1898. *Revisio generum plantarum* 3,2. Felix, Leipzig.
- LAMARCK, J.B.A.P.M. DE. 1783. *Encyclopédie méthodique* 1. Mme veuve Agasse, Paris.
- LINNAEUS, C. 1753. *Species plantarum*, edn 1. Salvii, Stockholm.
- LINNAEUS, C. 1767. *Mantissa plantarum*. Salvii, Stockholm.
- LINNAEUS, C. VON (filius). 1781. *Supplementum plantarum*. Impensis Orphanotropei, Brunswick.
- MARLOTH, R. 1915. *The flora of South Africa, with synoptical tables of the genera of the higher plants* 4. Darter, Cape Town.
- MASON, H. 1972. *Western Cape Sandveld flowers*. Struik, Cape Town.
- MATHEW, B. 1989. Notes on tropical African Asparagaceae. *Kew Bulletin* 44,1: 181–182.
- MCCLEAN, R.C. & IVIMEY-COOK, W.R. 1951. *Textbook of theoretical botany* 1. Longmans, New York.
- MONTAGNE, J.P.F.C. 1841. In P.B. Webb & S. Berthelot, *Histoire naturelle des Iles Canaries* 3(2:4): XV. Béthune, Paris.
- OBERMEYER, A.A. 1983. *Protasparagus* Oberm. nom. nov.: new combinations. *South African Journal of Botany* 2: 243–244.
- PHILLIPS, E.P. 1933. *Asparagus cooperi*. *The Flowering Plants of South Africa* 13: t. 503.
- POLE EVANS, I.B. 1931. *Asparagus suaveolens*. *The Flowering Plants of South Africa* 11: t. 409.
- PRAIN, D. 1909. *Asparagus tetragonus*. *Curtis's Botanical Magazine* 135: t. 8288.
- REGEL, E.A. VON. 1890. Descriptiones plantarum. *Acta Horti Petropolitani* 11: 301–314.
- ROEMER, J.J. & SCHULTES, J.A. 1829. *Caroli a Linné equitis Systema vegetabilium* 7,1. Cotta, Stuttgart.
- ROEMER, J.J. & SCHULTES, J.A. 1830. *Caroli a Linné equitis Systema vegetabilium* 7,2. Cotta, Stuttgart.
- SALTER, T.M. 1940. Plantae novae Africanae XV. *Journal of South African Botany* 6: 165–175.
- SALTER, T.M. 1950. *Asparagus*. In R.S. Adamson & T.M. Salter, *Flora of the Cape Peninsula*: 172–176. Juta, Johannesburg.
- SCHINZ, H. 1896. Die Pflanzenwelt Deutsch-Südwestafrikas. *Bulletin de l'Herbier Boissier* Sér. 1,4, App. III: 1–57.
- SCHULTES, J.A. 1827. *Mantissa in volumen (primum?)*. *Systematis vegetabilium Caroli a Linné* 3. Cotta, Stuttgart.
- SÖLCH, A., ROESSLER, H. & MERXMÜLLER, H. 1966. *Asparagus*. In H. Merxmüller, *Prodromus einer Flora Südwestafrikas* 147: 25–32.
- SUESSENGUTH, K. 1950. Diagnoses novae plantarum in Africa australi a Dr S. Rehm et aliis collectarum. *Mitteilungen der Botanischen Staatssammlung München* 2: 46–56.
- THUNBERG, C.P. 1794. *Prodromus plantarum capensium* I. Edman, Uppsala.
- THUNBERG, C.P. 1823. *Flora capensis*, ed. Schultes. Edman, Uppsala.
- VAN DER STEL, S. 1685. *Simon van der Stel's journey to Namaqualand in 1685*, transcription of original text by G.C. de Wet, English translation by R.H. Pfeiffer, 1979. Human & Rousseau, Cape Town.
- WATT, J.M. & BREYER-BRANDWIJK, M.G. 1962. *Medicinal and poisonous plants of southern and eastern Africa*, edn 2. Livingstone, Edinburgh & London.
- WATSON, W.W. 1894. *Asparagus sarmentosus*. *Gardeners' Chronicle* 16: 746, t. 94.
- WEIMARCK, H. 1937. Beiträge zur Kenntnis der Flora von Süd-Rhodesia VI. *Botaniska notiser* 1937: 419–446.
- WIGHT, R. 1853. *Icones plantarum Indiae orientalis*. Cramer, Weinheim.

WILLDENOW, C.L. 1799. *Caroli a Linné Species plantarum editio quarta* 2. Berlin.

WORDSWORTH, R., HUTCHINSON, J., BOLUS, F. & BOLUS, L. 1923. Flowering plants collected in South West Africa by the Percy Sladen Memorial Expedition, 1915–1916. *Annals of the Bolus Herbarium of the South African College* 3: 15–37.

1113b

2. MYRSIPHYLLUM

by A.A. OBERMEYER*

(Literature references on p. 81)

Myrsiphyllum Willd. in Gesellschaft naturforschender Freunde zu Berlin Magazin 2: 25 (1808); Kunth: 105 (1850); Oberm.: 86 (1984). Type species: *M. asparagoides* (L.) Willd. (= *Medeola asparagoides* L.).

Hecatris Salisb.: 66 (1866). Type species: *H. asparagoides* (L.) Salisb.

Asparagus section *Myrsiphyllum* (Willd.) Bak.: 597 (1875); Bak.: 258 (1896); Jessop: 38 (1966); R.A. Dyer: 943 (1976).

Perennial, innocuous, glabrous climbers or erect, usually chamaephytes. *Rhizome* cylindrical, often not lignified; cataphylls small or vestigial. *Roots* placed radially on the often long, creeping rhizome, or irregularly dorsiventral on a compact rhizome; forming fusiform tubers crowded on rhizome or distant from it, filled with soft tissue saturated with aqueous fluid; in *M. ovatum* (no. 3) and *M. undulatum* (no. 6) new plants may evolve on distal side of a tuber. *Stems* voluble or erect. *Phylloclades* solitary or 2- or 3-nate, placed in axils of scale leaves, the latter not forming spines. (*M. fasciculatum* (no. 12) forms an exception in that the cladodes are many in each fascicle and small spines are developed.) *Flowers* 1–3-nate, bisexual, pendulous on short to long pedicels or stalks (viz. a combination of pedicel and pericladium, separated by a disc). *Tepals* white, usually with a green central band, connivent at base, forming a cup or tube, free lobes recurved above (except in *M. ramosissimum* (no. 11) and *M. scandens* (no. 10) where they remain erect). *Stamens* erect, usually connivent around gynoecium with filaments flattened, attenuate above, widened below, where they may form two extended spurs; anthers introrse, yellow, orange or red. *Ovary* 3-locular; ovules 6–12 in each locule, biseriate; styles 1 or 3, stigmas 3, papillate. *Berry* globose or ovoid-apiculate, red, yellow or orange; seeds globose, black.

Species 12, recorded from the winter rainfall region, with *M. asparagoides* and *M. ramosissimum* extending along the eastern escarpment to the Transvaal; the former also spreading northwards to tropical Africa and southern Europe. Recently recorded as a troublesome adventive in Australia.

The genus *Myrsiphyllum*, separated from *Asparagus* by Willdenow (1808), was upheld by Kunth (1850). Baker (1875), however, placed it as a section of *Asparagus* and so did subsequent taxonomists. H. Huber in *The monocotyledons*, a comparative study by Dahlgren & Clifford (1982), resuscitated the genus and I agree. Huber divided the classical family Liliaceae of Kunth, Baker and others into two orders, Asparagales and Liliales. The former contains 24 families, the latter eight. His family Asparagaceae is represented by six genera; two of these, *Protasparagus* and *Myrsiphyllum*, are African.

The genus *Myrsiphyllum* takes its name from the phylloclades of *M. asparagoides* (L.) Willd. which resemble the leaves of the myrtle.

1a Phylloclades solitary:

2a Plants scandent (but cf. *M. multituberosum* which may be erect when stunted):

3a Phylloclades ovate to cordate, 12–20 mm broad:

4a Root tubers attached close to rhizome:

5a Styles 3; root tubers cylindrical, $\pm 10\text{--}12 \times 3$ mm, overlapping on long rhizomes 1. *M. multituberosum*

5b Style 1; root tubers fusiform, $\pm 40\text{--}60 \times 10\text{--}15$ mm, radiating from rhizome 2. *M. asparagoides*

4b Root tubers distant from rhizome 3. *M. ovatum*

3b Phylloclades narrowly ovate to broadly linear, $\pm 4\text{--}6$ mm broad:

6a Phylloclades narrowly ovate, midrib distant; root tubers fusiform, firm 4. *M. kraussianum*

6b Phylloclades narrowly elliptic without a distinct midrib, soft; root tubers oblong-globose 5. *M. volubile*

2b Plant erect:

7a Plants branching freely; phylloclades narrowly ovate-acuminate, strongly ribbed 6. *M. undulatum*

7b Plants 'fox-tail-shaped', viz. the erect stems bearing numerous contracted branches forming a leafy cylinder

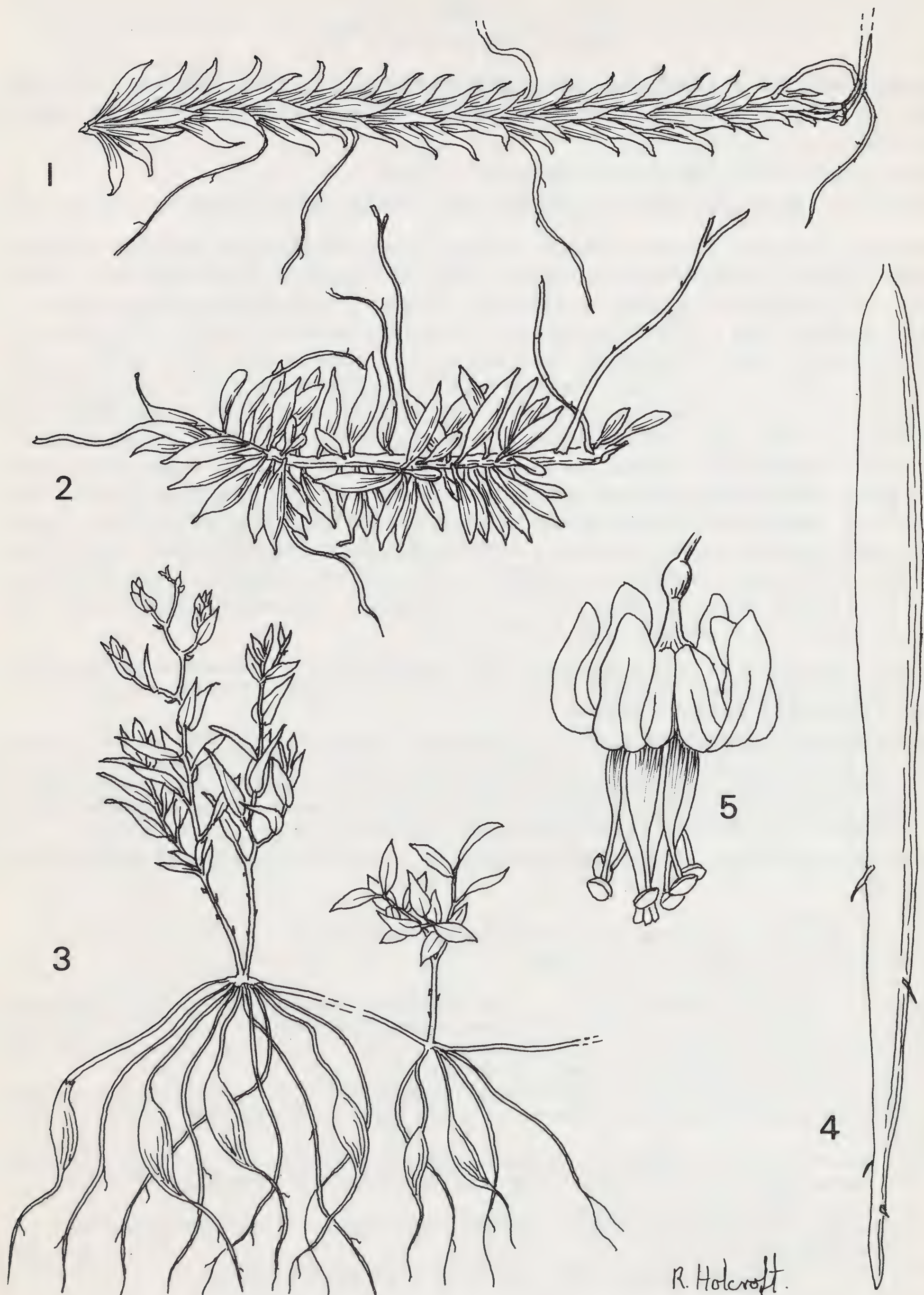
around stem; phylloclades narrowly linear:

8a Phylloclades 1–2 mm broad with smooth or minutely ciliate margins; roots with fusiform tubers some

distance away from rhizome 7. *M. juniperoides*

8b Phylloclades 0,5 mm broad; margin fimbriate; root tubers densely packed on rhizome 8. *M. alopecurum*

* Pinelands Place, Lonsdale Road, 7405 Pinelands; formerly of the Botanical Research Institute, Pretoria.



1b Phylloclades in fascicles of 3, or very numerous, linear to filiform; scandent, shade-loving:

9a Phylloclades in dense fascicles (15–30-nate), linear, arcuate, ± 4 –8 mm long 12. *M. fasciculatum*

9b Phylloclades in fascicles of 3, linear to filiform:

10a Branches declinate (viz. forming recurved loops); branchlets short with overlapping phylloclades; berry ovoid, shortly pointed above and below, many-seeded 9. *M. declinatus*

10b Branches and branchlets spreading at right angles to stem; berry globose, 1–few-seeded:

11a Phylloclades spreading in one plane, shallowly S-shaped, ± 2 mm wide, one opposing two others and one shorter than other two 10. *M. scandens*

11b Phylloclades laxly spreading, ± 1 mm wide, with a prominent midrib; stems, branches and branchlets angled 11. *M. ramosissimum*

1. ***Myrsiphyllum multituberosum*** (R.A. Dyer) Oberm. in Bothalia 15: 77 (1984). Type: Ceres, Karooport, Marloth 9006 (PRE, holo.!, STE!).

Asparagus multituberosus R.A. Dyer: 442 (1954).

A. asparagoides sensu Jessop: 81 (1966).

Scandent with thin stems up to $\pm 0,4$ m tall, or short, erect and compact (in dry areas in Namaqualand). *Rhizome* thin, horizontal, up to 0,5 m long, covered by a cylinder of overlapping small, fusiform, pointed tubers $\pm 10 \times 3$ mm, occasionally some continuing below as normal thin roots but scattered long filiform roots are also produced, sometimes one of these producing a tuber distant from rhizome (Figure 14.1). *Phylloclades* ovate to cordate, ± 15 –25 mm long, apiculate, many-veined, margin papillate (Figure 15.1). *Flowers* 1–3 in axils of membranous scale leaves; stalk ± 5 mm, curved, articulated below perianth *Tepals* ± 7 mm, forming a wide tube below, spreading above. *Stamens* as long as tepals, filaments expanded at base, flat. *Ovary* ovoid, with 10–12 ovules in each locule. *Styles* 3, curved outwards; stigmas apical, papillate. *Berry* not seen.

Known only from the western Cape in montane vegetation. Flowering July to September. Map 44.

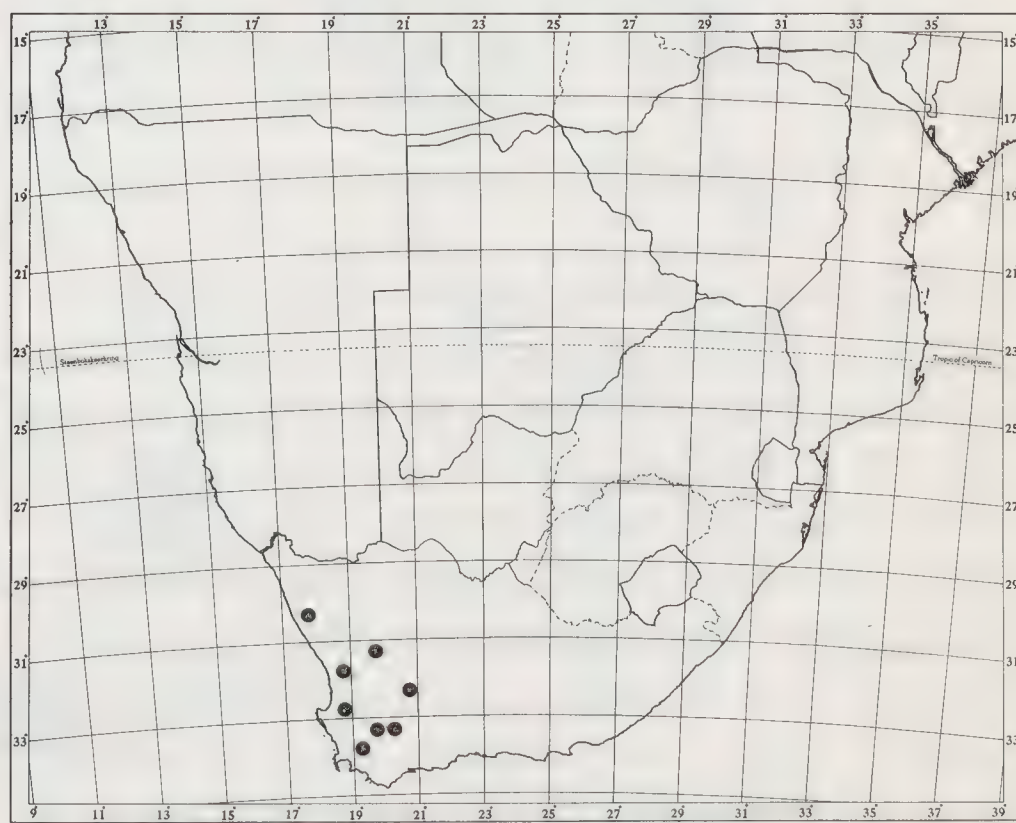
It is the only species of *Myrsiphyllum* in which the three styles have not fused into a single column.

Vouchers: Bayer 3454; Marloth 9006; Marloth 12778; Rösch & Le Roux 01218 (01211); Schlechter 8069.

2. ***Myrsiphyllum asparagoides*** (L.) Willd. in Gesellschaft naturforschender Freunde zu Berlin Magazin 2: 25 (1808); Kunth: 105 (1850); Hook. f.: t. 5584 (1866). Type: Tilli, Catalogus Plantarum Horti Pisani, t. 12, f. 1 (1723) as 'Asparagus Africanus, scandens Myrti folio' (icono.).

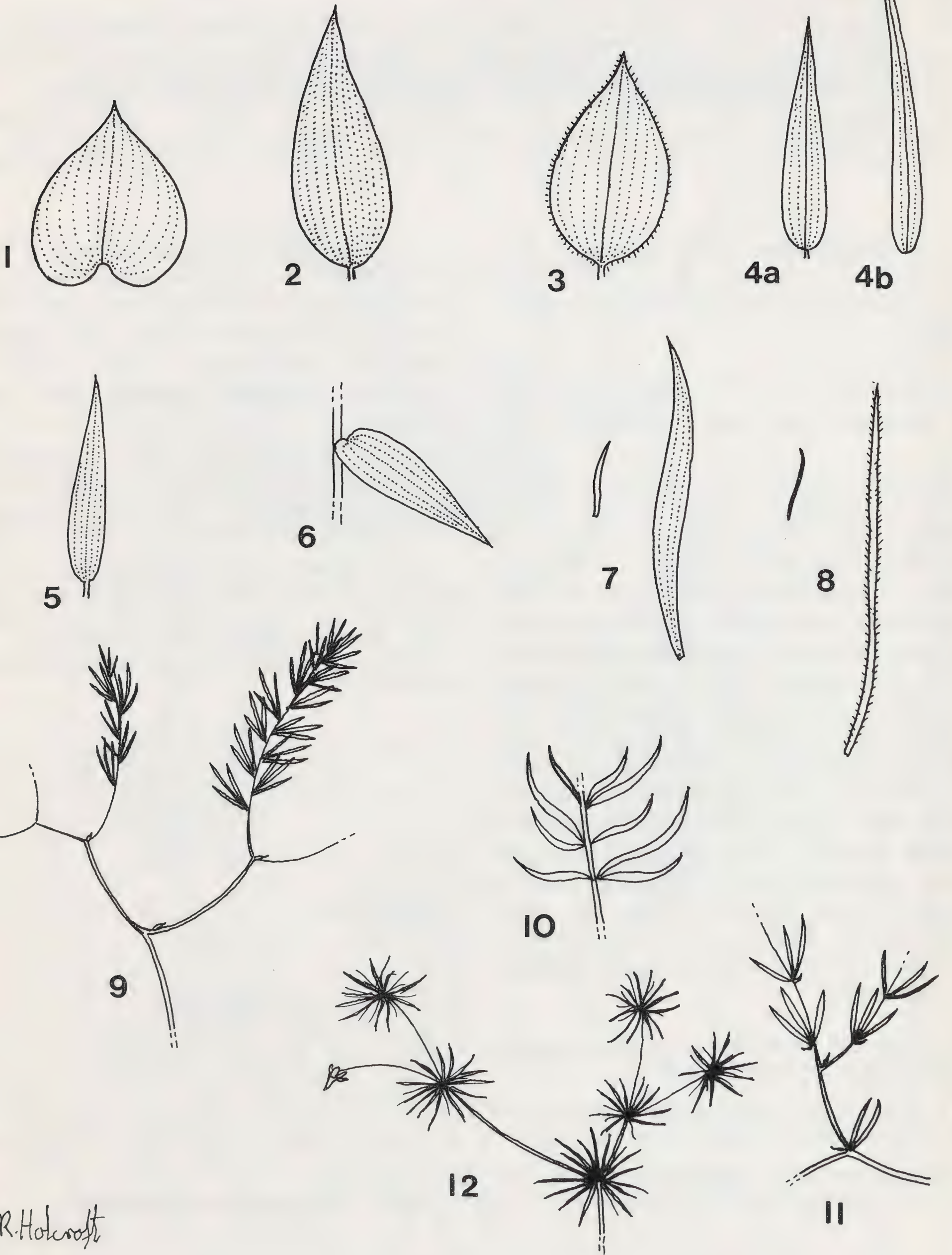
Medeola asparagoides L.: 339 (1753); L.: 370 (1771); Del.: t. 442 (1816). *Hecatris asparagoides* (L.) Salisb.: 66 (1866). *Asparagus asparagoides* (L.) Wight: 854 (1909); Jessop: 81 (1966), nom. illegit. *A. asparagoides* (L.) Druce: 414 (1914).

Medeola angustifolia Mill.: (1768); Ait.: 490 (1789). *Myrsiphyllum angustifolium* (Mill.) Willd.: 25 (1808). *A. medeoloides* (L.f.) Thunb. var. *angustifolius* (Mill.) Bak.: 273 (1896). Type: Tilli, Catalogus Plantarum Horti Pisani, t. 12, f. 2 (1723), as 'Asparagus Africanus, scandens Myrti folio angustiore' (icono.).



MAP 44.—*Myrsiphyllum multituberosum*

FIGURE 14.—*Myrsiphyllum multituberosum*: 1, root system, $\times 1$. *M. asparagoides*: 2, root system, $\times 0,5$. *M. ovatum*: 3, showing young plant appearing from a root, reduced [after Salter (1940), Figure 1]. *M. fasciculatum*: 4, root, $\times 0,25$. *M. ovatum*: 5, flower, $\times 6$ [after Dyer (1943), Plate 1146]. Artist: R. Holcroft.



R. Holcroft

Dracaena medeoloides L.f.: 203 (1781). *Asparagus medeoloides* (L.f.) Thunb.: 66 (1794); Thunb.: 333 (1823); Bak.: 627 (1875); Bak.: 272 (1896); Marloth: t. 20F (1915). Type: Cape of Good Hope, without precise locality, *Thunberg* (UPS, holo.; BOL!, PRE!, photos of sheet 8453).

Elide Medik. (1791) by lectotypification, cf. Farr *et al.*: 1139 (1979).

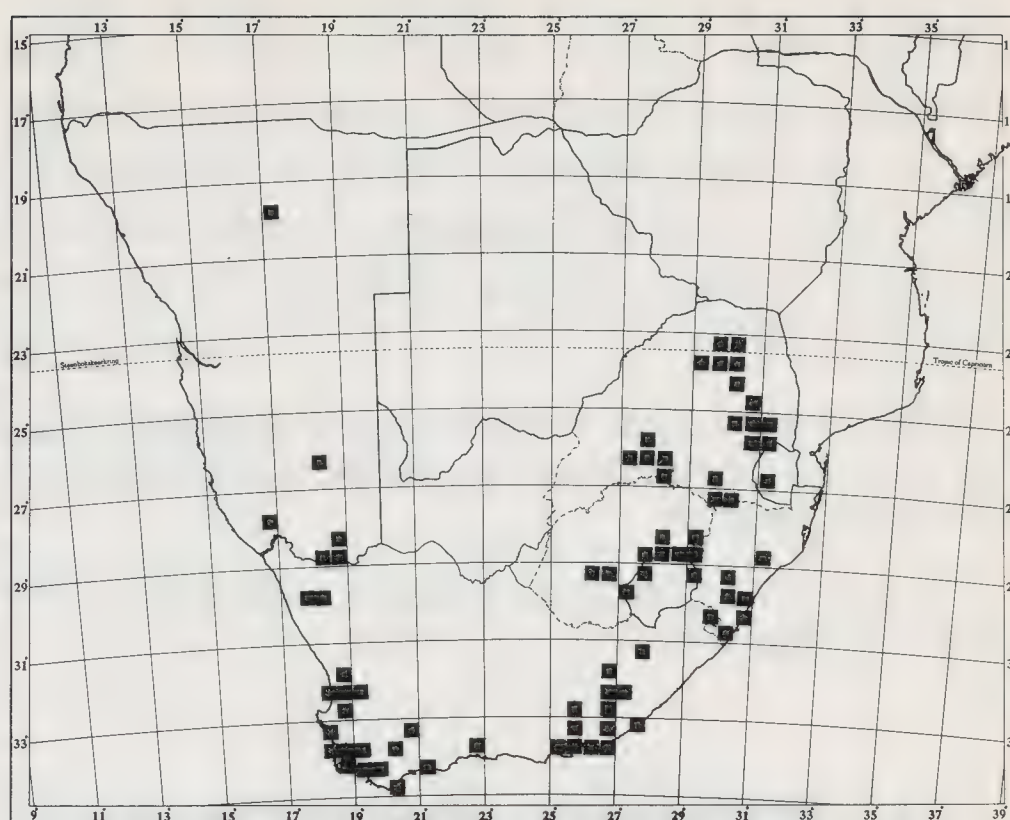
Myrsiphyllum falciforme Kunth: 107 (1850); Saunders: t. 47 (1869). Type: Cape, without precise locality, *Drège* 2704a in 'Herb. Luc.' (K, iso.). *A. medeoloides* (L.f.) Thunb. var. *falciformis* (Kunth) Bak.: 273 (1896).

A. kuisibensis Dinter: 270 (1931). Type: Namibia at the Kuiseb River, *Tjuezu* in *Herb. Dinter* 4698 (B, holo.; PRE, photo!).

Scandent, much branched perennials with shiny green, ovate phylloclades, deciduous or semideciduous. *Rhizome* cylindrical, bearing numerous fusiform root tubers $\pm 40\text{--}60 \times 10\text{--}20$ mm, radially arranged, variable in size, close to rhizome (Figure 14.2). *Stems* twisting, wiry, smooth or ridged, up to 2 m tall. *Branches* usually short, with beaded ridges. *Phylloclades* variable in size and shape, ovate-acuminate, $\pm 25\text{--}40 \times 8\text{--}20$ mm, flat or folded and curved, many-nerved but mostly with 3 more pronounced on each side; margin smooth or minutely denticulate (Figure 15.2). *Flowers* on pedicels ± 10 mm long, articulated below perianth. *Tepals* 6–10 mm long, forming a tube in lower half, reflexed above. *Stamens* erect, connivent, expanded below into 2 small spreading teeth; anthers red. *Ovary* pear-shaped, stipitate, narrowed into a style as long as ovary; ovules ± 6 in each locule; stigmas short, spreading, ciliate. *Berry* globose, 10 mm in diameter, usually many-seeded.

Widespread and common in southern and eastern Cape forests and coastal valley bushveld; inland in wooded areas and along riverbanks in the eastern parts of Natal and Transvaal. Also recorded from Namibia and further north to tropical Africa. Naturalized locally in southern Europe. An invader in Australia where it has become troublesome. Flowering July to September. Map 45.

Introduced in England in 1702 by the Duchess of Beaufort. It was in cultivation in the hortus in Pisa, Italy, and illustrated in Tilli's *Catalogue of plants* in 1723, t. 12, fig. 1. The



MAP 45.—*Myrsiphyllum asparagoides*

plant pictured on the right-hand side has narrower, somewhat smaller phylloclades, which led Tilli, Miller and others to regard it as a separate species but the phylloclades vary in size and width. The origin of the plants figured by Tilli is unknown.

Vouchers: *Archibald* 3610; *Goldblatt* 2638; *Merxmüller & Giess* 32272; *Purcell* 7; *Rösch & Le Roux* 457; *Ward* 4998.

3. *Myrsiphyllum ovatum* (Salter) Oberm. in *Bothalia* 15: 79 (1984). Type: Cape, Rugby, *Salter* 8214 (BOL, holo.!, NBG!, PRE!).

Asparagus ovatus Salter: 167 (1940); Salter: 174 (1950); R.A. Dyer: t. 1146 (1943).

A. asparagoides sensu Jessop: 81 (1966).

Scandent, with twining branches up to 1.0–1.5 m tall. *Rhizome* compact, scaly, woody with long roots extending in all directions, bearing numerous hard, swollen, fusiform tubers $\pm 50\text{--}100 \times 20$ mm, far removed from rhizome; much smaller in young plants; tubers may bring forth young plants at their proximal ends (Figure 14.3). *Phylloclades* deciduous, ovate, 30×15 mm but variable in size, many-nerved, shiny (Figure 15.3). *Flowers* 1–3, beside the base of a phylloclade; pedicels ± 10 mm, articulated near base

FIGURE 15.—Phylloclades of *Myrsiphyllum* species: 1, *M. multituberosum*, $\times 1$; 2, *M. asparagoides*, $\times 1$; 3, *M. ovatum*, $\times 1$; 4, *M. kraussianum*: a, typical form, b, elongated form, $\times 1$; 5, *M. volubile*, $\times 1$; 6, *M. undulatum*, $\times 1$; 7, *M. juniperoides*, $\times 1$ and $\times 4$; 8, *M. alopecurum*, $\times 1$ and $\times 4$; 9, *M. declinatum* showing declinate branching, $\times 1$; 10, *M. scandens*, $\times 1$; 11, *M. ramosissimum*, $\times 1$; 12, *M. fasciculatum* $\times 1$. Artist: R. Holcroft.

of flower (Figure 14.5). *Perianth* ± 6 mm, tepals reflexed near centre. *Stamens* with filaments flattened, erect, bearing a small basal spur on each side. *Ovary* oblong, with $\pm 8-10$ ovules in each locule; style and stigmas just exerted from staminal column. *Berry* globose, 10 mm in diameter, red.

Confined to the Cape Province, usually along the coastal belt from the south-western Cape to the eastern Cape, but also inland. Map 46.

Vouchers: *Dyer* 5338; *Leach & Bayliss* 12647; *Mauve* 5347; *Mauve & Hugo* 243.

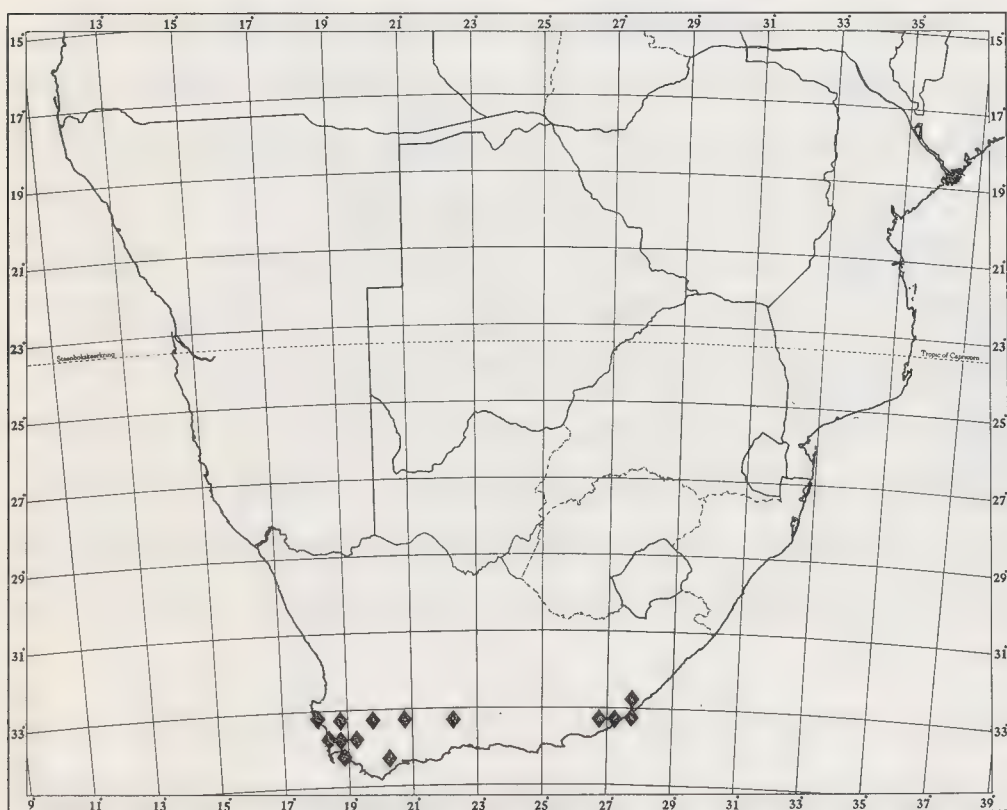
4. *Myrsiphyllum kraussianum* Kunth, *Enumeratio plantarum* 5: 107 (1850) (as *kraussianum*). Type: Cape, Wynberg, Constantia, *Krauss* 1333 (B, holo.; in errore *Krause*).

Asparagus kraussianus (Kunth) MacBride: 17 (1981); Salter: 174 (1950). *A. kraussii* Bak.: 272 (1896).

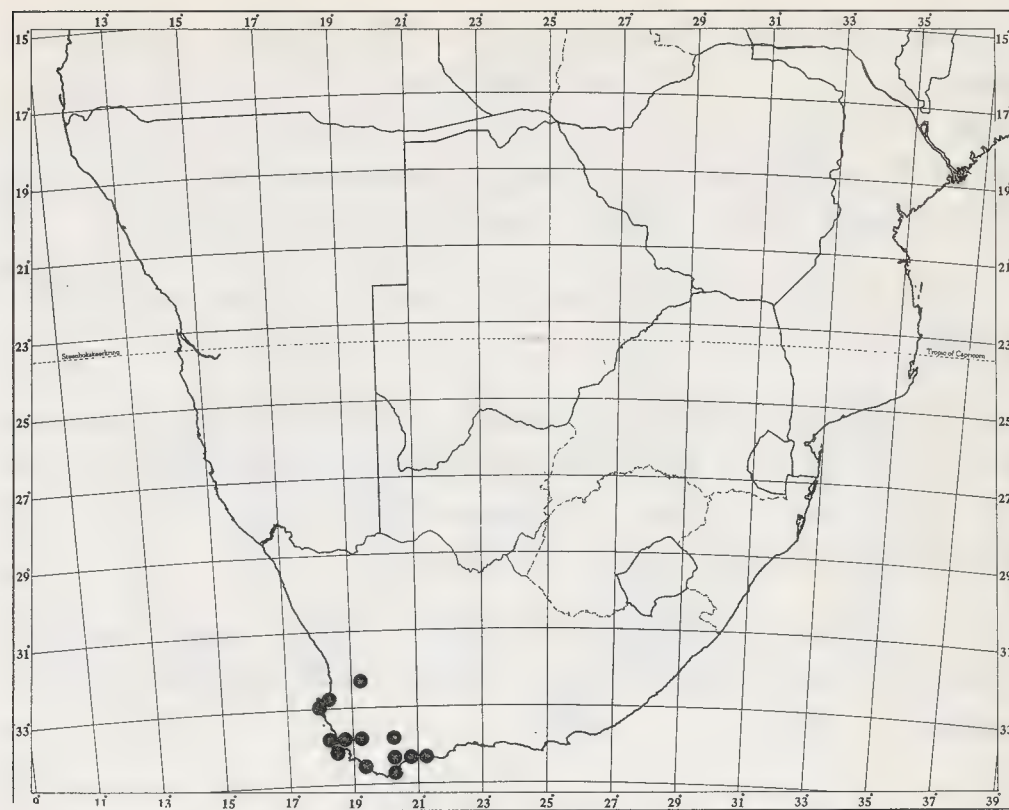
A. asparagoides sensu Jessop: 81 (1966).

?*M. gramineum* Kunth: 108 (1850). Type: Cape of Good Hope, collector unknown (B).

Scandent, 1–2 m tall, resembling *M. asparagoides* (no. 2) but with straight, narrower phylloclades and shorter pedicels. *Rhizome* bearing a congested cluster of sessile fusiform tubers. *Stems* and branches laxly curved, angled, ridged. *Phylloclades* narrowly cordate-acuminate, $\pm 15-30 \times 5$ mm, flat, striate, with a distinct



MAP 46.—*Myrsiphyllum ovatum*



MAP 47.—*Myrsiphyllum kraussianum*

midrib, apiculate (Figure 15.4). *Flowers* pendulous, axillary; pedicels $\pm 3-5$ mm long, articulated below perianth. *Tepals* ± 5 mm, white with a green midrib. *Stamens* with flattened filaments bearing two basal spurs; anthers orange. *Ovary* with 6 ovules in each locule. *Berry* 6–9 mm in diameter, red.

Occurs in the southern Cape: recorded from the Cape Peninsula to the south-western Cape, in strandveld and fynbos. Map 47.

A form of this species, bearing longer, narrower phylloclades $\pm 35-45$ mm long, has been collected around the south-western Cape, viz. Ceres, Worcester, Laingsburg and Swellendam: *Bayer* 3153, 3344; *Bond* 247; *Mauve & Hugo* 240.

Vouchers: *Acocks* 17992; *Barker* 10227; *Purcell* 68; *Strey* 521; *Taylor* 10235; *Van Breda & Joubert* 1960.

5. *Myrsiphyllum volubile* (Thunb.) Oberm. in *Bothalia* 15: 82 (1984). Type: Cape, without locality, *Thunberg* 8469 (UPS, holo.; PRE, photo!).

Asparagus volubilis Thunb.: 66 (1794); Thunb.: 332 (1823); Roem. & Schult.: 347 (1829); Bak.: 628 (1875); Bak.: 262 (1896).

?*Ruscus volubilis* Thunb.: 13 (1794); Kunth: 276 (1850). Type as above. *Dracaena volubilis* L.f.: 204 (1781). The name is mentioned on the microfiche edition, Nr 435/4 but no specimen is shown. Bak.: 272 (1896) identified it as *A. scandens* Thunb.

A. asparagoides auct. non Druce: Jessop: 81 (1966).

Scandent with wiry twisted stems and short leafy branches, ± 1.0 – 1.5 m tall, often with a garlic scent. *Rhizome* terete, bearing swollen bulbous tubers ± 300 – 500 mm long, closely attached to it. *Stems* bearing short branches 40–80 mm long. *Phylloclades* broadly linear, abruptly acute above and below, ± 15 – 20×3 mm, without a distinct midrib, flat, soft, pale green (Figure 15.5). *Flowers* on short pedicels 4–5 mm long, articulation below perianth; tepals fused below, spreading above, ± 5 mm long, cream. *Stamens* with orange anthers, typical. *Ovary* ovoid; ovules 6 in each locule; style short. *Berry* not seen.

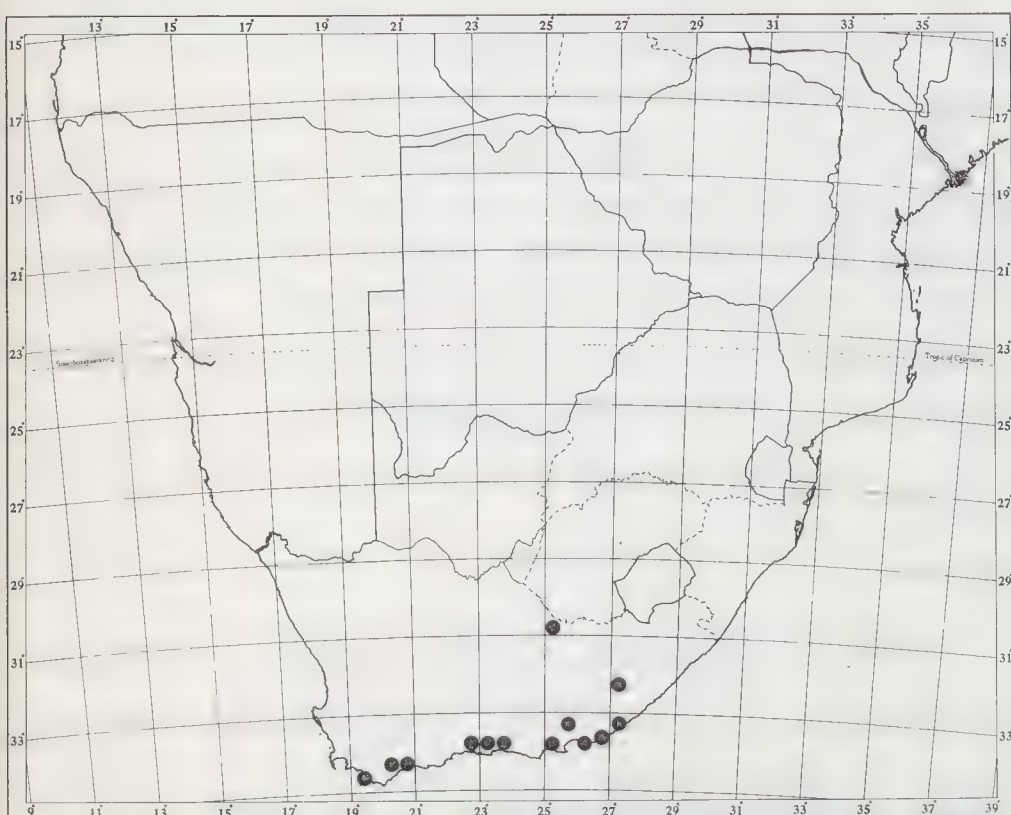
Recorded from the southern to north-eastern Cape, in fynbos, coastal scrub or in forest undergrowth. Map 48.

Myrsiphyllum volubile can be distinguished from *M. kraussianum* (no. 4) by its softer phylloclades, which are rounded at the base and do not show a midrib.

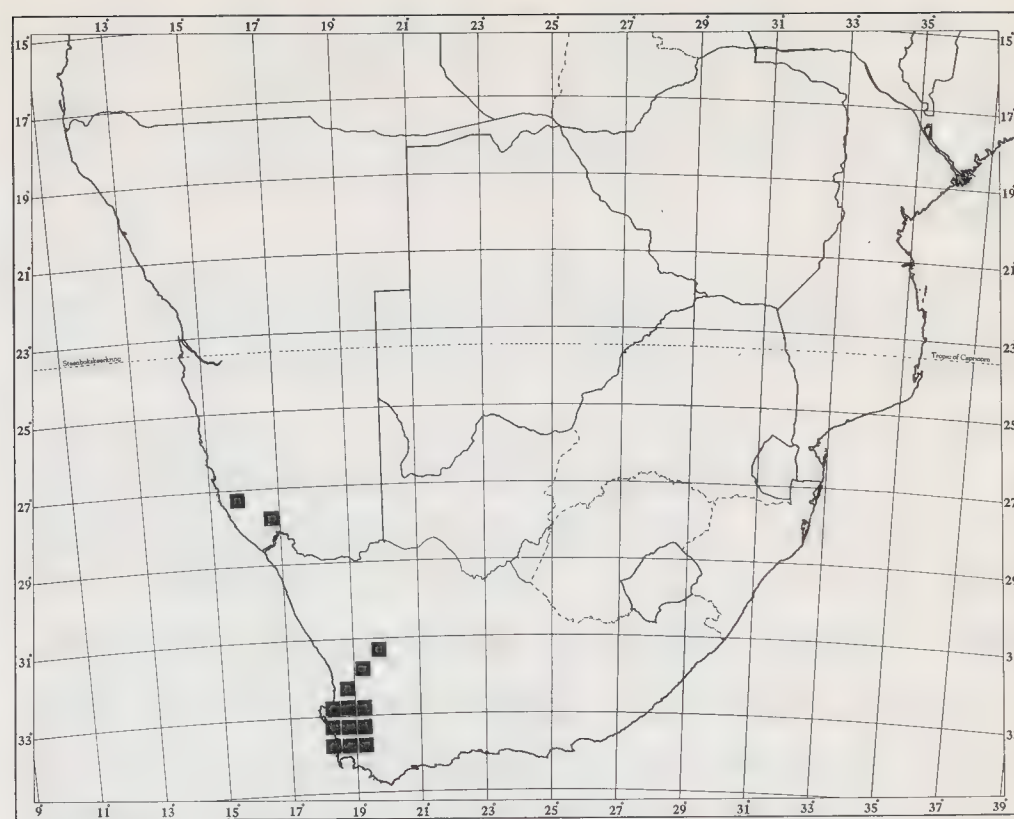
Said to give off 'a garlic odour which scents the air around' (Tyson in Tvl. Mus. 17552 in PRE). Milk becomes tainted when cows feed on this plant.

Vouchers: Archibald 4557; Ecklon & Zeyher 4; Geldenhuys 639; Jessop 623; Mauve & Hugo 124, 138, 174, 241; Sim 4082; Smook 3819; Thode A2771.

6. *Myrsiphyllum undulatum* (L.f.) Kunth, Enumeratio plantarum 5: 109 (1850). Type: Cape



MAP 48.—*Myrsiphyllum volubile*



MAP 49.—*Myrsiphyllum undulatum*

of Good Hope, without precise locality, Thunberg (UPS, 8446; PRE, photo!).

Dracaena undulata L.f.: 203 (1781); Roem. & Schult.: 346 (1829). *Asparagus undulatus* (L.f.) Thunb.: 66 (1794); Bak.: 628 (1875); Bak.: 273 (1896); Marloth: t. 20E, Fig. 24a (1915); Salter: 173 (1950); Sölch: 39 (1960); Jessop: 84 (1966).

A. klinghardtianus Dinter: 270 (1931). Type: Namibia: Klinghardtgebirge, Dinter 3998 (B, holo.! PRE!).

Erect, rigid bushes (chamaephytes) 0.3–0.5 m tall, with long, simple, spreading branches bearing regularly placed phylloclades. *Rhizome* compact, scaly, bearing numerous roots, some of these with large fusiform tubers continued below as normal long, thin roots; occasionally they may produce a new shoot. *Stem* erect, ridged, with spreading, long, usually simple branches. *Phylloclades* ovate-acuminate, up to 25 mm long (smaller on new growth), leathery, striate, often folded above (Figure 15.6). *Flowers* pendulous, 1–3 at a node; pedicels ± 5 – 9 mm long, with disc below perianth. *Tepals* broadly linear, ± 6 mm long, purple or green with cream margins, reflexed in upper half. *Stamens* with flat attenuate filaments bearing 2 small basal spurs; anthers orange. *Ovary* with 8–10 ovules in each locule. *Berry* globose, ± 5 mm in diameter, red.

Recorded from the Cape Peninsula along the west coast to Namibia, usually in the strandveld with its sandy soil. Flowering in spring. Map 49.

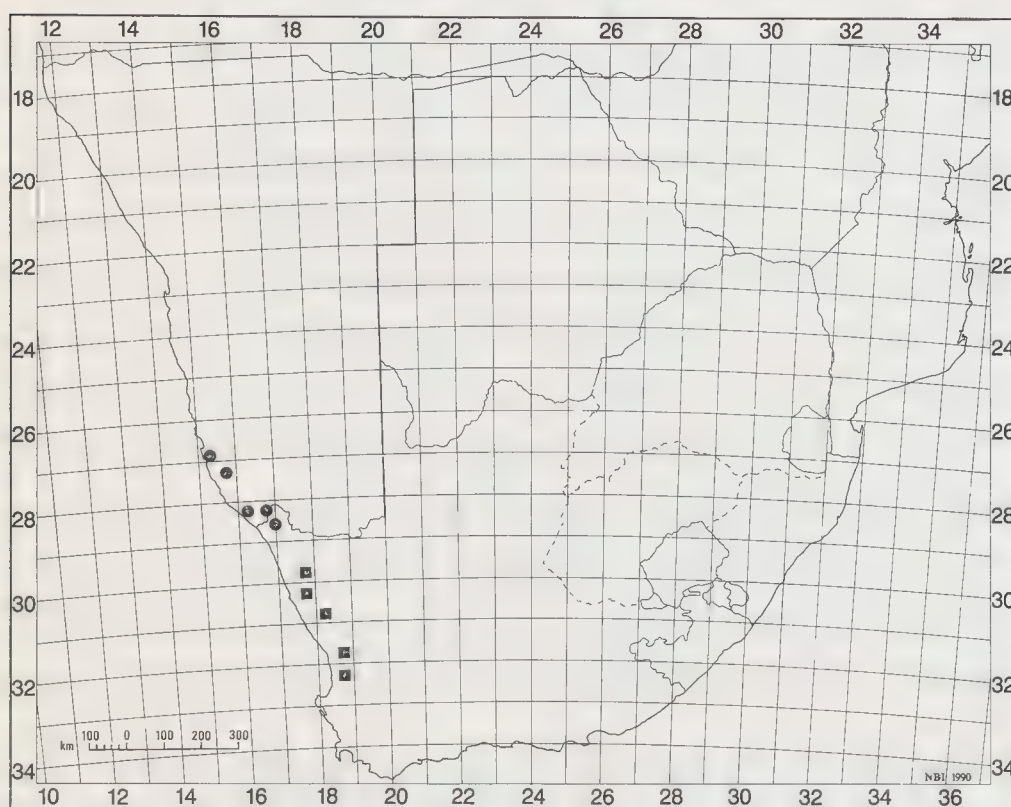
Vouchers: Goldblatt 2280; Mauve 5339; Merxmüller & Giess 28756; Schlechter 8461; Van Niekerk 598.

7. *Myrsiphyllum juniperoides* (Engl.) Oberm. in *Bothalia* 15: 84 (1984). Type: Namibia, Aus, *Marloth* 1538 (B, holo.; PRE, photo!).

Asparagus juniperoides Engl.: 3 (1889); Schinz: 44 (1896); Sölch: 37 (1960); Jessop: 63 (1966), pro parte.

Erect chamaephytes with stems up to 0,5 m tall, covered by a 'cylinder' of short 'leafy' branches (viz. phylloclades) \pm 40 mm in diameter ('fox-tail' habit). *Rhizome* dorsiventral, creeping, bearing numerous long roots which form fusiform swellings \pm 30 mm long towards root tips, up to 120 mm away from rhizome, densely covered by a velamen of root hairs when young. *Branches* short, erect, \pm 10–30 mm long, overlapping placed in axil of a short membranous erect scale leaf. *Phylloclades* solitary, linear, \pm 10 \times 2 mm, apiculate, margin smooth, bright shiny green (Figure 15.7). *Flowers* axillary, solitary, on peduncles \pm 1 mm long. *Tepals* narrowly oblong, \pm 6 mm long, forming a short tube below, curved outwards in upper half, outer ciliate. *Stamens* with outer shorter than inner, filaments fused to tepals in lower half, erect. *Ovary* obovoid with \pm 10 ovules in each locule; style about as long as ovary; stigmas apical. *Berry* \pm 5 mm diameter, several-seeded, red.

A psammophyte recorded from southern Namibia and northern Namaqualand, with a few records further inland. Map 50.



MAP 50. — ● *Myrsiphyllum juniperoides*
■ *M. alopecurum*

Vouchers: *Dinter* 3723; *Giess* 13004; *Merxmüller & Giess* 3418; *Verdoorn* 1835.

8. *Myrsiphyllum alopecurum* Oberm. in *Bothalia* 15: 85 (1984). Type: Cape, 22 km west by south of Springbok, *Acocks* 19268 (PRE, holo!).

Chamaephyte with erect annual stems \pm 0,5 m tall, slender, attenuate above, covered by a feathery 'cylinder' of much abbreviated, densely leafy branches, appearing 'fox-tail'-shaped. *Rhizome* creeping, long, densely covered by numerous allantoid, shortly stalked root tubers, placed in all directions, up to 40 \times 10 mm, continued below as normal thin roots, densely covered by a velamen of root hairs. *Stems* ridged, scale leaves persisting. *Branches* \pm 30 mm long, ascending, overlapping. *Phylloclades* narrowly linear, \pm 12 \times 0,5 mm, glossy, yellow-green, margin densely ciliate, apex mucronate (Figure 15.8). *Flowers* solitary on the short branches; pedicels 1 mm long with the disc below perianth. *Tepals* free, connivent, forming a tube, curved outwards above, linear, obtuse, \pm 7 mm long, white with a green midrib, margin of outer tepals densely, shortly ciliate, inner smooth. *Stamens* with filaments fused to tepals in lower half, outer somewhat shorter. *Ovary* oblong-ovoid with 4 ovules in each locule; style as long as ovary, stigmas small, curved outwards. *Berry* several-seeded, \pm 7 mm in diameter, red?

Apparently endemic to the north-western Cape from Namaqualand to Clanwilliam, in sandy places in Namaqualand Broken Veld. Flowering in winter. Map 50.

Marloth 6719 from Garies-Okiep and *Andreae* 409 from Klawer show a sudden lengthening of the upper side branches giving the plants a plumose apex. This has also been observed in other species adopting the cylindric habit.

Schlechter on some of his collections gave it the name *alopecurus* (as *alepocurus*), meaning fox-tail.

Vouchers: *Marloth* 6719, 7794; *Schlechter* 8028; *Van der Westhuizen* 272.

9. *Myrsiphyllum declinatum* (L.) Oberm. in *Bothalia* 15: 86 (1984). Type: Herbarium van Royen in Herb. Lugd. Bat. 913 62 567 (L, holo!; PRE, photocopy!).

Asparagus crispus Lam.: 295 (1783); Roem. & Schult.: 326 (1829); Kunth: 73 (1850); Bak.: 607 (1875); Bak.: 259

(1896); Marloth: t. 20 (1915); Salter: 174 (1950); Jessop: 80 (1966). Type: 'L'île de France' (Mauritius), *collector unknown* (P, holo.; PRE, photo!).

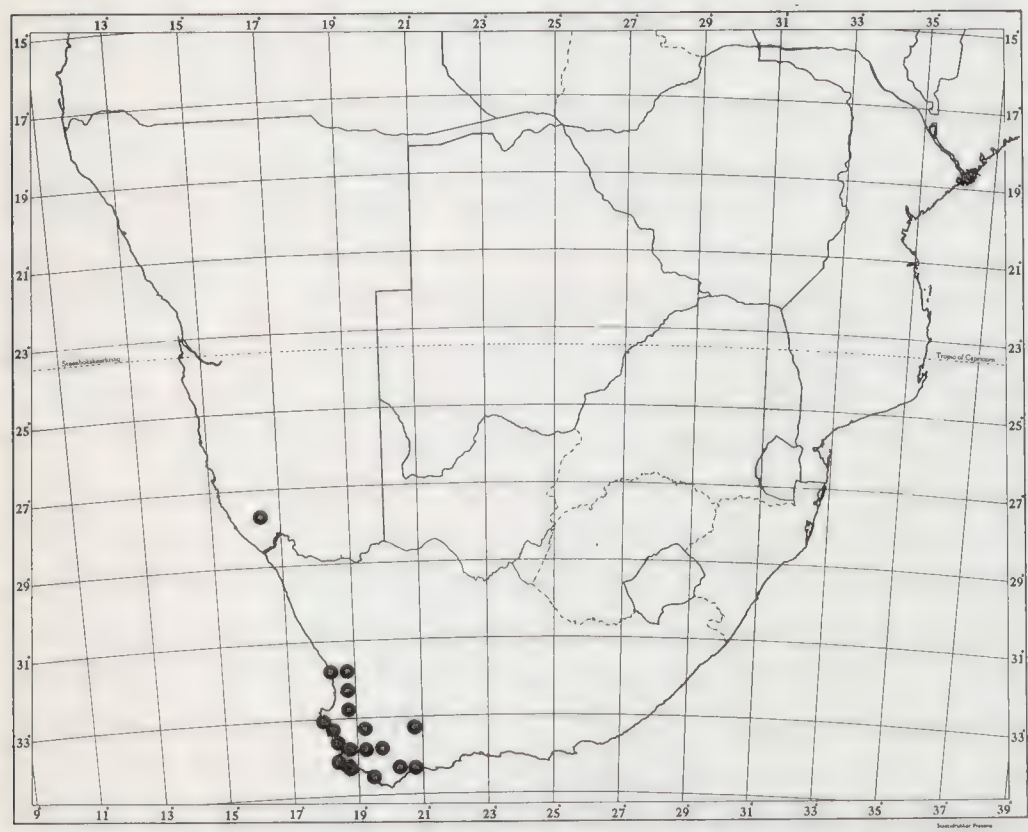
A. flexuosus Thunb.: 66 (1794); Kunth: 74 (1850). Type: Cape of Good Hope, without precise locality, *Thunberg* (UPS, 8450, holo.; PRE, photo!).

A. decumbens Jacq.: 51, t. 97 (1797). *Asparagopsis decumbens* (Jacq.) Kunth: 77 (1850). Type: Cape of Good Hope, without precise locality, *collector unknown*.

Soft, deciduous, copiously branched scramblers up to ± 1 m high. *Rhizome* creeping, covered by numerous thick fusiform root tubers up to 50 mm long. *Stems* annual, angled, thin, green, declinate; branches likewise (Figure 15.9); branchlets short, bearing overlapping ternate cladodes, or sometimes these more laxly arranged. *Cladodes* linear-acuminate, ± 5 –15 mm long, somewhat arcuate. *Flowers* solitary on pedicels ± 5 –11 mm long, articulated below truncate base of flower; tepals broadly linear, reflexed in upper half, ± 5 mm long, white to pale pink. *Stamens* with filaments bearing 2 basal spurs; anthers orange red. *Ovary* oblong-ovoid, tapered into a persistent style, dark green; locules with 2–4 ovules. *Berry* oblong-ovoid, attenuate below, apiculate, ± 12 mm long, whitish, semi-transparent, 3–9-seeded.

Recorded from southern Namibia to Namaqualand, the Cape Peninsula and east as far as Riversdale; in fynbos or coastal scrub, usually on rocky outcrops. Flowering May to September. Map 51.

Vouchers: *Bos* 168; *Compton* 14640; *Hall* 3640; *Merxmüller* & *Giess* 32218; *Oliver* 3430; *Taylor* 8621.



MAP 51.—*Myrsiphyllum declinatum*

10. *Myrsiphyllum scandens* (Thunb.) Oberm. in *Bothalia* 15: 86 (1984). Syntypes: Cape of Good Hope, without precise locality, *Thunberg* s.n. (UPS, 8461, 8462; BOL! PRE! photos).

Asparagus scandens Thunb.: 66 (1794); Roem. & Schult.: 325 (1829); Saund.: t. 21 (1869); Bak.: 622 (1875); Bak.: 268 (1896); Salter: 174 (1950); Jessop: 78 (1966).

A. pectinatus Del.: t. 407 (1813). Type: 'l'Orangerie du jardin la Malmaison', t. 407 (iconotype).

Asparagopsis scandens (Thunb.) Kunth: 78 (1850).

Herbaceous perennial, scandent, up to 2 m tall, probably evergreen. *Rhizome* small, covered by fusiform roots 20–40 mm long, tapering towards root tips. *Stems* twining, wiry. *Phylloclades* arranged close together on one plane on both sides of branchlets, the whole resembling the frond of a fern, ternate on alternating sides, one cladode somewhat longer than other two, shallowly S-shaped, apiculate, 1-nerved, ± 8 –17 mm (Figure 15.10). *Scale leaves* minute, forming fringed, white, membranous tufts at nodes. *Flowers* pendulous, 1–3 at a node, on pedicels up to ± 10 mm long, articulated below attenuate pericladium. *Tepals* spreading, ± 4 mm long, white. *Stamens* attenuate towards apex; anthers green or yellow. *Ovary* globose with 3 or 4 ovules in each locule; style erect, short, with 3 spreading stigmas. *Berry* globose, ± 8 mm in diameter, orange or red, 1- or 2-seeded.

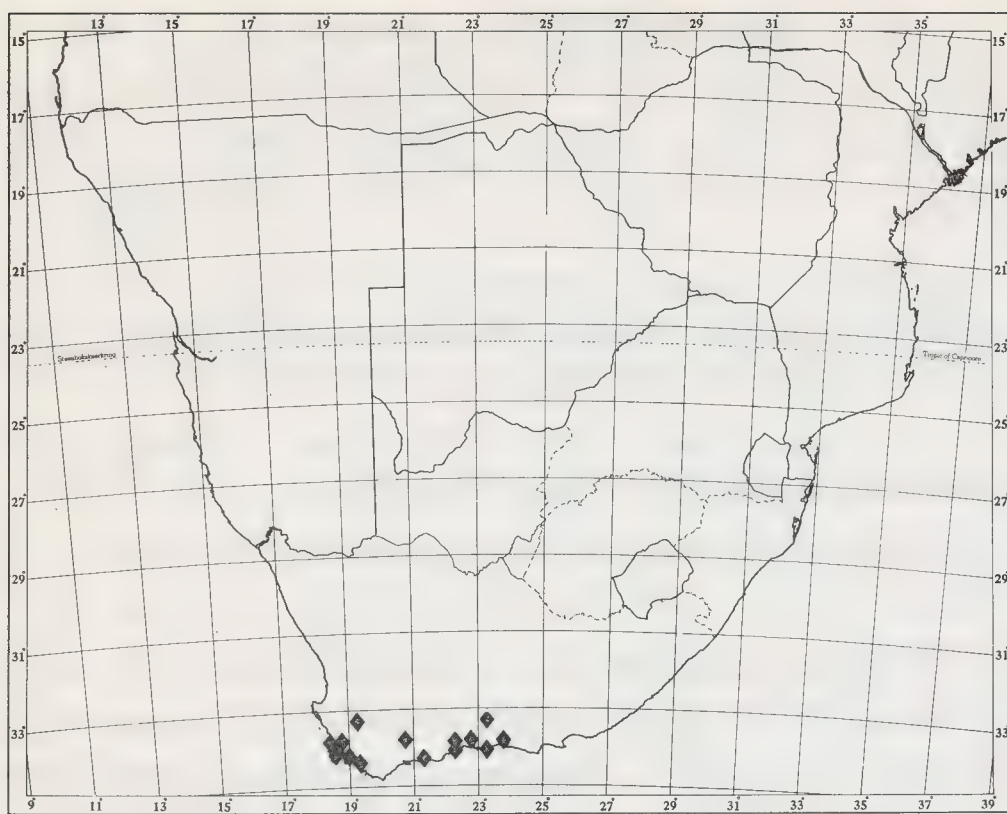
A Cape endemic. Recorded from the west coast at St Helena Bay to the Cape Peninsula and eastwards as far as Tsitsikamma. Also inland as far as Worcester; a shade-loving plant, frequent in wooded areas, needing moisture all the year round, apparently evergreen. Flowering August to October. Map 52.

Myrsiphyllum scandens and the next species, *M. ramosissimum*, have perianths similar to those of *Protasparagus* but agree in all other respects with *Myrsiphyllum*. They are considered more primitive.

Vouchers: *Ecklon* & *Zeyher* s.n.; *Friis*, *Norlindh* & *Weimarck* 540; *Marloth* 4517; *Mauve* & *Hugo* 232; *Werdermann* & *Oberdieck* 355.

11. *Myrsiphyllum ramosissimum* (Bak.) Oberm. in *Bothalia* 15: 87 (1984). Type: eastern Cape, Pirie Forest near King Williamstown, *Flanagan* 2235 (PRE, neo!).

Asparagus ramosissimum Bak.: 6 (1874); Bak.: 622 (1875); Bak.: 268 (1896).



MAP 52.—*Myrsiphyllum scandens*

A. scandens Thunb. var. *deflexus* Bak.: 622 (1875); Bak.: 268 (1896). Type: Somerset East, Boschberg, MacOwan 1771 (BOL; SAM).

Scandent, 1–2 m tall, evergreen perennial. *Rhizome* creeping, woody, scaly, ± 20 mm in diameter, producing fusiform root tubers terminating in long thin roots. *Stems* green, angled, ridges minutely papillate. *Branches* and branchlets spreading. *Phylloclades* usually 3-nate, linear, flat above, keeled below, $8-12 \times 0.7$ mm, apiculate, margin minutely papillate (Figure 15.11). *Flowers* solitary, similar to those of *Protasparagus*; stalk filiform, ± 10 mm, articulated in lower half, pendulous. *Tepals* spreading, oblong-attenuate, $\pm 3-4$ mm, outer with a small callosity at base, white. *Stamens* with linear-acuminate filaments, anthers yellow or red, apiculate. *Ovary* ovoid, attenuated into a short style, stigmas with short, spreading, ciliate lobes; ovules ± 6 in each locule. *Berry* red or orange, 1–3-seeded.

Recorded from montane areas in the eastern Transvaal, eastern O.F.S., Natal and eastern Cape to the southern Cape; in forests, kloofs and riverbank vegetation, in moist shady places. Flowering in summer. Map 53.

Baker (1874) described this species from a living plant, collected by Cooper in the Cape and cultivated by Wilson Saunders in his garden at Reigate. It was evidently not preserved [Jessop: 80 (1966)].

Vouchers: Compton 28084, 30552; Dahlgren 1851; Devenish 206; Dieterlen 707; Galpin 10173, 14531; Kerfoot, Gooyer & Eastman 286; Killick 1105; Strey 6292.

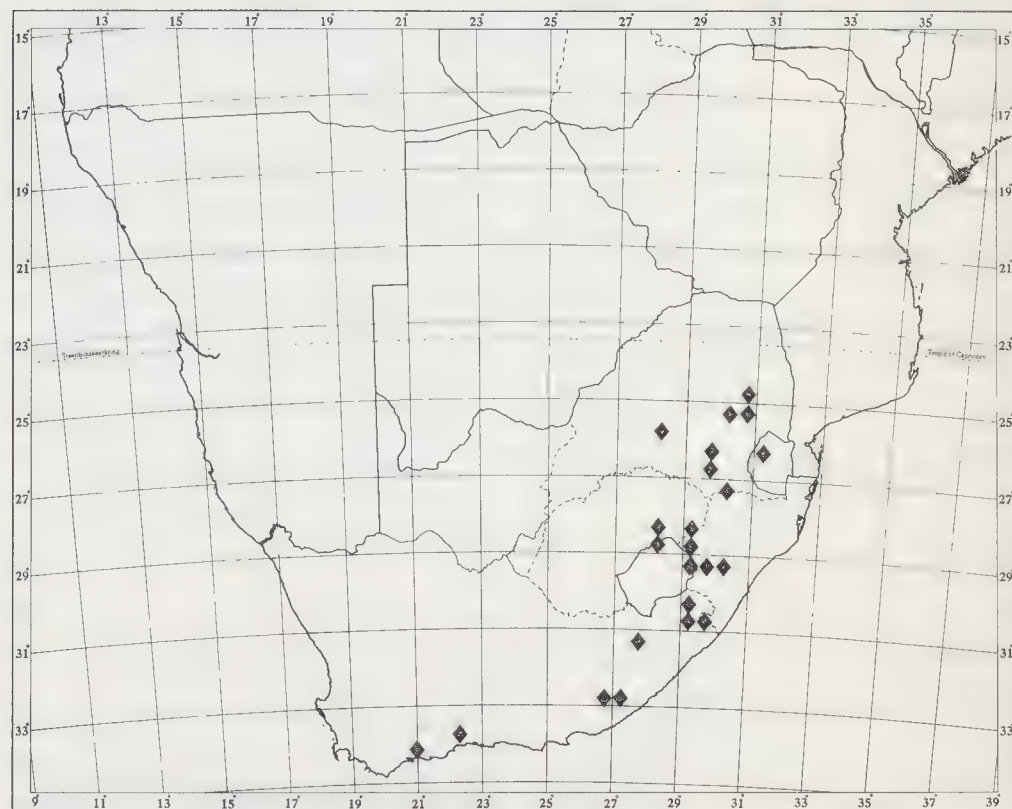
12. *Myrsiphyllum fasciculatum* (Thunb.) Oberm. in Bothalia 15: 87 (1984). Type: Cape, without precise locality, Masson s.n. (UPS, sub Thunberg 8447, holo.; BOL; PRE!, photos).

Asparagus fasciculatus Thunb.: 329 (1823); Jessop: 54 (1966).

Asparagopsis consanguinea Kunth: 76 (1850). *Asparagus consanguineus* (Kunth) Bak.: 615 (1875); Bak.: 260 (1896). Type: Cape, without precise locality, Drège s.n. (KIEL, holo., PRE, photo!; K, PRE, photo!).

Note: on the Kew sheet, N.E. Brown gave Drège's locality as 'between Krom River and Pietersfontein on the Piquetberg, under 1 000 ft, July.' *Asparagopsis schlechtendalii* Kunth: 90 (1850). Type: Cape, at the Olifants River, Krebs s.n. (March) (B, holo.?).

Scandent or prostrate, nonspinous (rarely with some small spines on stem below), much branched with deciduous cladodes in feathery fascicles, bearing solitary flowers. *Rhizome* woody with numerous swollen roots (Figure 14.4), $\pm 300-600$ mm long and ± 20 mm in diameter, smaller in young plants. *Stems* spineless, or with some brittle spines below, glabrous, reddish brown. *Branches* widely spaced, laxly zigzagging, in turn producing numerous short branchlets bearing the cladode fascicles. *Cladodes* unequally long, 15–30-nate, $\pm 5-10$ mm long, smooth, apiculate, somewhat curved, greyish green, deciduous (Figure 15.12). *Flowers* apical, solitary or rarely 2- or 3-nate, beside a cladode fascicle; pedicel ± 5 mm long with disc below perianth. *Tepals* ± 5 mm, broadly linear,

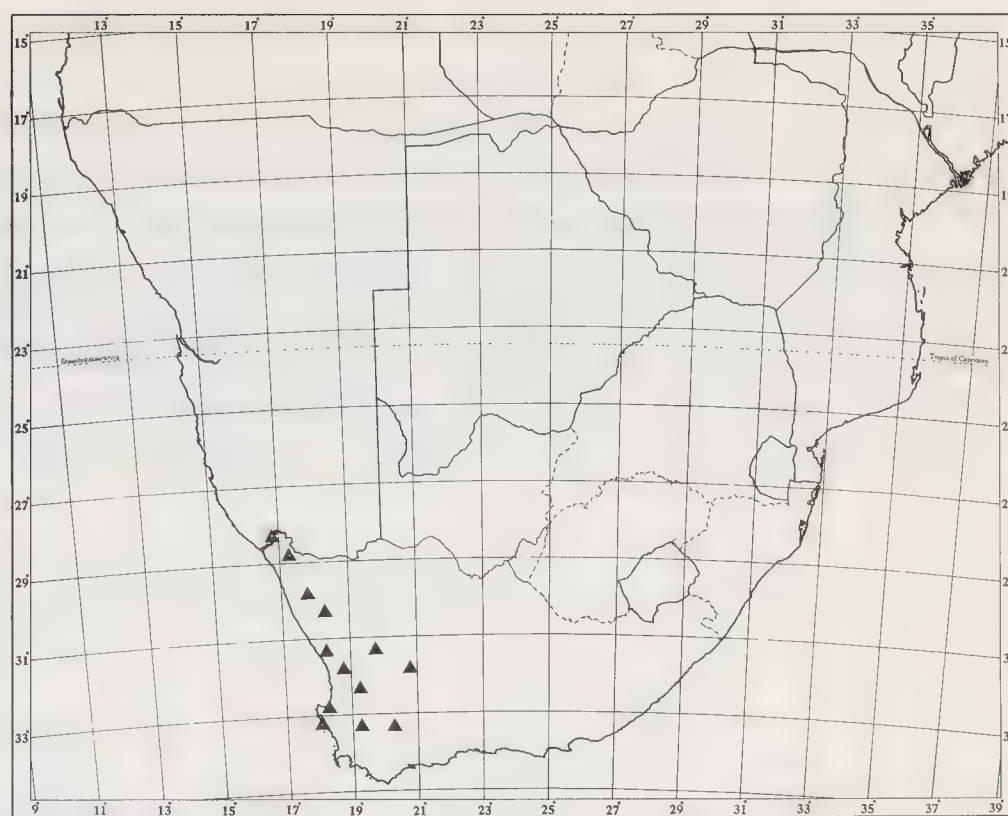


MAP 53.—*Myrsiphyllum ramosissimum*

white with a brown central stripe, forming a tube, recurved above. *Stamens* erect, filaments flat, attenuate above, abruptly narrowed below, forming basal spurs; anthers orange or yellow. *Ovary* oblong-ovoid, shortly stipitate, with 6–8 ovules in each locule, style long, stigmas short, spreading. *Berry* several-seeded, ± 10 mm in diameter, pinkish red.

Common in the western strandveld up to Namaqualand and the southern Karoo as far as Laingsburg. Not recorded from the Cape Peninsula. The young cladodes appear from March to April; flowering from May to June; fruits ripen in September. Map 54.

The fascicles containing numerous cladodes are unusual for this genus, but the pendulous flower, including the true pedicel, are typical of *Myrsiphyllum*. In old plants the root system develops into a huge mass of long cylindrical roots, each 0.3–0.6 m long and ± 30 mm thick. Marloth (his no. 9049) counted up to 120 ‘finger thick’ roots; Bayer 3287 shows a similar mass (Obermeyer 1984).



MAP 54.—*Myrsiphyllum fasciculatum*

Vouchers: Bolus 13882; Ecklon & Zeyher 1675; Esterhuysen 1805; Leistner 3390; Marloth 9049; Schlechter 7890; Thompson & Le Roux 112; Werger 414.

REFERENCES

- AITON, W. 1789. *Hortus kewensis*, edn 1. George Nicol, London.
- BAKER, J.G. 1874. In *Gardeners' Chronicle* n.s. 2: 6.
- BAKER, J.G. 1875. Revision of the genera and species of Asparagaceae. *Journal of the Linnean Society of London, Botany* 14: 594–631.
- BAKER, J.G. 1896. *Asparagus*. In W.T. Thiselton-Dyer, *Flora capensis* 6: 256–274. Reeve, London.
- DAHLGREN, R.M.T. & CLIFFORD, H.T. 1982. *The monocotyledons*. Academic Press, London.
- DELILE, A.R. 1813. *Asparagus pectinatus*. In P.J. Redouté, *Les Liliacées* VII. Paris.
- DELILE, A.R. 1816. *Medeola asparagoides*. In P.J. Redouté, *Les Liliacées* VIII. Paris.
- DINTER, K. 1931. Diagnosen neuer südwestafrikanischer Pflanzen 39. *Repertorium novarum specierum regni vegetabilis* 29: 253–272.
- DRUCE, G.C. 1914. Notes on nomenclature. In supplement to Botanical Exchange Club Report for 1913. *The Botanical Society and Exchange Club of the British Isles Report for 1913* 3,5: 413–426.
- DYER, R.A. 1943. *Asparagus ovatus*. *The Flowering Plants of Africa* 29: t. 1146.
- DYER, R.A. 1954. Liliaceae. *Bothalia* 6: 440–445.
- DYER, R.A. 1976. *The genera of southern African flowering plants* 2. Department of Agricultural Technical Services, Pretoria.
- ENGLER, A. 1889. Plantae Marlothianae. Liliaceae. *Botanische Jahrbücher* 10: 2–3.
- FARR, E.R., LEUSINK, J.A. & STAFLEU, F.A. 1979. *Index nominum genericorum (plantarum)*. Bohn, Scheltema & Holkema, Utrecht.
- HOOKE, J.D. 1866. *Myrsiphyllum asparagoides*. *Curtis's Botanical Magazine*, 3rd series, 22: t. 5584.
- JACQUIN, N.J. 1797. *Plantarum rariorum horti caesarei schoenbrunnensis descriptiones et icones*, Vol. 1. Wappler, Vienna.
- JESSOP, J. 1966. The genus *Asparagus* in southern Africa. *Bothalia* 9: 31–96.
- KUNTH, C.S. 1850. *Enumeratio plantarum* 5. Cotta, Stuttgart & Tübingen.
- LAMARCK, J.B.A.P.M. DE. 1783. *Encyclopédie méthodique* 1. Mme veuve Agasse, Paris.
- LINNAEUS, C. 1753. *Species plantarum*, edn 1. Salvii, Stockholm.
- LINNAEUS, C. 1771. *Mantissa plantarum altera*. Salvii, Stockholm.
- LINNAEUS, C. VON (filius). 1781. *Supplementum plantarum*. Impensis Orphanotrophi, Brunswick.
- MACBRIDE, J.F. 1918. In *Contributions from the Gray Herbarium of Harvard University* 56: 17.
- MARLOTH, R. 1915. *The flora of South Africa, with synoptical tables of the genera of the higher plants* 4. Darter, Cape Town.
- MILLER, P. 1768. *The gardener's dictionary*, edn 6. London.
- OBERMEYER, A.A. 1984. Revision of the genus *Myrsiphyllum* Willd. *Bothalia* 15: 77–88.
- ROEMER, J.J. & SCHULTES, J.A. 1829. *Caroli a Linné equitis Systema vegetabilium* 7,1. Cotta, Stuttgart.
- SALISBURY, R.A. 1866. *The genera of plants*. Van Voorst, London.
- SALTER, T.M. 1940. Plantae novae Africanae XV. *Journal of South African Botany* 6: 165–175.

- SALTER, T.M. 1950. *Asparagus*. In R.S. Adamson & T.M. Salter, *Flora of the Cape Peninsula*: 172–176. Juta, Johannesburg.
- SAUNDERS, W.W. 1869. *Refugium botanicum*. Van Voorst, London.
- SCHINZ, H. 1896. Die Pflanzenwelt Deutsch-Südwestafrikas. *Bulletin de l'Herbier Boissier* Sér. 1,4, App. III: 1–57.
- SÖLCH, A. 1960. *Beiträge zu einer Flora Südwest-Afrikas*. Ludwig-Maximilians-Universität, Munich.
- THUNBERG, C.P. 1794. *Prodromus plantarum capensium* I. Edman, Uppsala.
- THUNBERG, C.P. 1823. *Flora capensis*, ed. Schultes. Edman, Uppsala.
- TILLI, M.A. 1723. *Catalogus plantarum Horti Pisani*. Typis Regiae Celsitudinis, apud Tartinium et Franchium, Florentiae.
- WIGHT, W.F. 1909. In *Century Dictionary* II: 845.
- WILLDENOW, C.L. 1808. In *Gesellschaft naturforschender Freunde zu Berlin Magazin* 2: 25.

LUZURIAGACEAE

Slender forest climbers with much branched woody stems from rhizomes with swollen roots. *Leaves* alternate, sessile, parallel-veined with slight reticulate venation; stipules and similar structures absent. *Flowers* small, in few-flowered, lax, axillary cymes. *Tepals* 3 + 3, forming a short broad tube with lobes equal, spreading. *Stamens* 3 + 3, arising from lower half of perianth tube, extending to the mouth; filaments free, terete; anthers introrse, versatile. *Ovary* 3-locular, attenuate at base; ovules axile, few; style trigonous; stigma apical, obtuse, tripartite. *Fruit* a berry with a short basal stipe; seeds 3–15.

Genera 4 or 5 with 7 or 9 species; southern South America, South Africa, Australia, Indonesia and New Zealand.

1147

BEHNIA

by A.A. OBERMEYER*

(Literature references on p. 84)

Behnia *Didr.* in Videnskabelige Meddelelser fra Dansk naturhistorisk Forening i Kjöbenhavn 1854: 182 (1855); Bak.: 561 (1875); Bak.: 274 (1896); Hutch.: 627 (1959); Dyer: 944 (1976).

Dictyopsis Harv.: t. 5638 (1867); Harv.: 406 (1868).

Brehnia Bak. (in error for *Behnia*): 561 (1875).

Description as for the family.

A monotypic genus.

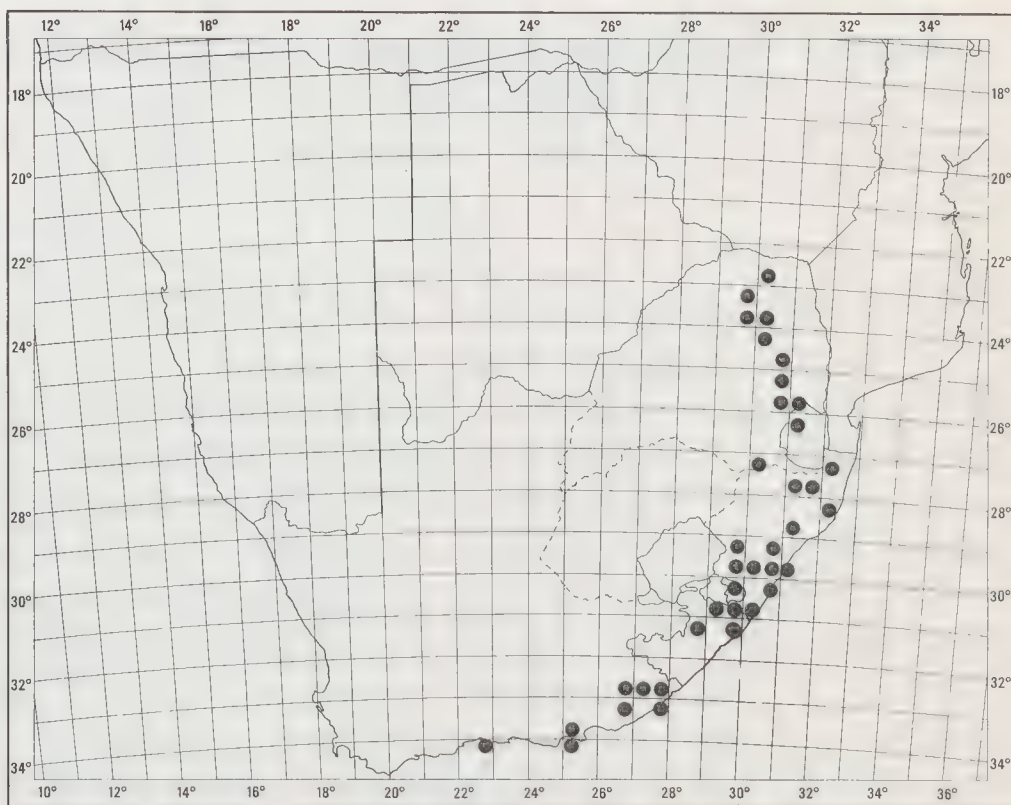
Behnia reticulata (*Thunb.*) *Didr.* in Videnskabelige Meddelelser fra Dansk naturhistorisk Forening i Kjöbenhavn 1854: 182 (1855); Bak.: 274 (1896); Krause: 380 (1930).

Ruscus reticulatus Thunb.: 13 (1794); Thunb.: 161 (1811); Thunb.: 38 (1823); Willd.: 876 (1825); Kunth: 276 (1850). Type: South Africa, without locality, *Thunberg* (UPS holo., but not on microfiche). *Dictyopsis thunbergii* Harv.: t. 5638 (1867). *Hylonome reticulata* (Thunb.) Bak.: 561 (1875).

Tall, glabrous, shiny, slender, evergreen forest climber. *Rhizome* compact, with numerous thick roots. *Stems* thin. *Leaves* alternate, ovate-acuminate, $\pm 70 \times 30$ mm but variable in size, apiculate, closely reticulate-veined, shiny, thin. *Flowers* in axils of upper leaves in loose, few- to many-flowered, axillary cymes, small, cream or green; peduncle and pedicels wiry. *Perianth* ± 7 mm long, forming a short, broad tube contracted into a short stipe below, where attached to the short pedicel; lobes short, spreading. *Stamens* 6, just reaching mouth of tube, fused halfway to the tube below; filaments terete;

anthers introrse, versatile. *Ovary* ovoid, 3-locular, ovules few, axile. *Fruit* a berry, green to light yellow or whitish (drying black), ± 10 mm in diameter; seeds more or less globose, hard, black, ± 8 mm in diameter. Figure 16.

Endemic; in forests from the southern and eastern Cape to Natal, Swaziland, Transvaal and Zimbabwe. Map 55.



* Pinelands Place, Lonsdale Road, 7405 Pinelands; formerly of the Botanical Research Institute, Pretoria.

MAP 55.—*Behnia reticulata*



FIGURE 16. — *Behnia reticulata*: 1, flowering branch, $\times 0,67$; 2, flower, $\times 2$; 3, fruit, $\times 0,67$ (1 and 2 after Flanagan 271, 3 after Van der Schijff 4548). Artist: G. Condly.

Vouchers: Acocks 8999; Archibald 3648; Dahlstrand 1850; Devenish 891; Ecklon & Zeyher s.n.; Edwards 2689; Flanagan 271; Forbes 684; Galpin 517; Junod 4171; Obermeyer sub TRV 30390; Pegler 777; Strey 8770; Van der Schijff 4548; Venter & Vorster III; Ward 2969.

REFERENCES

- BAKER, J.G. 1875. Revision of the genera and species of Asparagaceae. *Journal of the Linnean Society of London*, Botany 14: 508–632.
- BAKER, J.G. 1896. *Asparagus*. In W.T. Thiselton-Dyer, *Flora capensis* 6: 256–274. Reeve, London.
- DIDRICHSEN, D.F. 1855. In *Videnskabelige Meddelelser fra Dansk naturhistorisk Forening i Kjöbenhavn* 1854: 182.
- DYER, R.A. 1976. *The genera of southern African flowering plants* 2. Department of Agricultural Technical Services, Pretoria.
- HARVEY, W.H. 1867. *Dictyopsis thunbergii*. *Curtis's Botanical Magazine* 93: t. 5638.
- HARVEY, W.H. 1868. *The genera of South African plants*, 2nd edn. Juta, Cape Town.
- HUTCHINSON, J. 1959. *The families of flowering plants*, 2nd edn. Clarendon, Oxford.
- KRAUSE, K. 1930. Luzuriagoideae. *Die Natürlichen Pflanzenfamilien*, edn 2, 15a: 378–381.
- KUNTH, C.S. 1850. *Enumeratio plantarum* 5. Cotta, Stuttgart & Tübingen.
- THUNBERG, C.P. 1794. *Prodromus plantarum capensium* I. Edman, Uppsala.
- THUNBERG, C.P. 1811. *Flora capensis*, edn 1, Vol. 1,2. Edman, Uppsala.
- THUNBERG, C.P. 1823. *Flora capensis*, ed. Schultes. Edman, Uppsala.
- WILLDENOW, C.L. 1825. *Caroli a Linné Species plantarum* 4,2. Berlin.

SMILACACEAE

Scandent, glabrous, dioecious shrubs (rarely erect) with many tough, perennial prickly stems from a compact rhizome with numerous roots. *Leaves* alternate, on short petioles, with a pair of spiral tendrils near base of petiole (an extension of the leaf sheath); blade with 3–5 strong nerves and reticulate venation between main veins, firm. *Flowers* regular, hypogynous, unisexual, small, in axillary umbels or terminal compound inflorescences. *Tepals* 3 + 3, free, petaloid. *Male flowers* with 6(–15) free stamens; anthers basifixed, the locules confluent, appearing unilocular; ovary 0. *Female flowers* with 6 filiform staminodes; ovary 3-locular, with 1 or 2 axile ovules; style 0 or short; stigmas 3. *Fruit* a berry with 1–3 globose or semiglobose seeds.

Genera 4 with about 375 species; throughout the tropical and subtropical regions of the World and in a few temperate areas.

1151

SMILAX

by A.A. OBERMEYER*

(Literature references on p. 86)

Smilax L., Species plantarum edn 1: 1028 (1753); Kunth: 160 (1850); A. DC.: 45 (1878); Bak.: 162, t. 106 (1878); Bak.: 256 (1896); Bak.: 423 (1898); Krause: 382 (1930); Hutch.: 618 (1959); Dyer: 944 (1976). Type species: *S. foliolus* L.

Description as for the family.

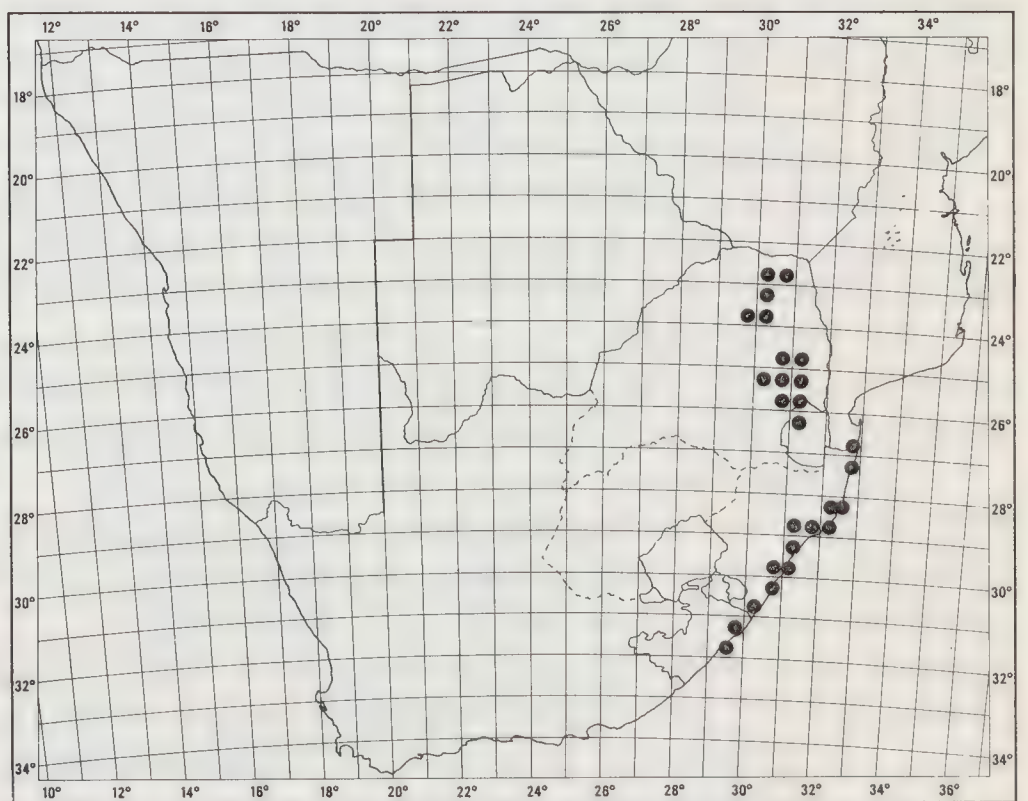
Smilax anceps Willd., Species plantarum 4: 782 (1806); A. DC.: 169 (1878); Coode: 2 (1978). Type: Mauritius, W. Heyne (B-W 18393, holo.).

Smilax kraussiana Meisn., in Krauss: 312 (1845); Kunth: 242 (1850); Bak.: 162, t. 106 (1875); A. DC.: 171 (1878); Bak.: 256 (1896); Bak.: 423 (1898); Wood: t. 339 (1906). Type: Natal, Drège 4503 (LUC, holo.). Fide Cowley: 2 (1989).

S. mossambicensis Garcke: 518 (1862–1864). Type: Mozambique, Peters (B, holo.).

Scandent, dioecious, glabrous, spiny suffrutes. *Rhizome* large with age; roots numerous, swollen. *Stems* tough, with scattered, small, sharp, exserted prickles. *Leaves* alternate, usually in one plane with a pair of spirally coiled tendrils near the base (an extension of the leaf sheath); petiole short; blade firm, flat, broadly oblong, $\pm 60\text{--}100 \times 30\text{--}60$ mm, obtuse to acute, apiculate, net-veined, with two strong lateral nerves on each side of midrib. *Inflorescence* an axillary globose umbel, many-flowered; peduncle ± 30 mm long. *Flowers* with pedicels ± 5 mm long, which become discoid at apex and

base with age; basal bracts minute. *Male flowers* with 6 broadly linear, recurved tepals, ± 5 mm long, fused into a short broad cup below. *Stamens* 6, placed on base of perianth; anthers basifixed, erect, filiform, in line with filament. *Female flowers* with perianth similar to that of male flowers. *Staminodia* 3, filiform, short. *Ovary* ovoid; styles 3, recurved; ovule solitary in each

MAP 56.—*Smilax anceps*

* Pinelands Place, Lonsdale Road, 7405 Pinelands; formerly of the Botanical Research Institute, Pretoria



FIGURE 17.—*Smilax anceps*: 1, flowering branch, $\times 0,67$; 2, male flower, $\times 2,6$; 3, female flower, $\times 2,6$; 4, infructescence, $\times 0,67$ [1 and 4 after Watt & Breyer-Brandwijk (1962), 2 and 3 after Wood (1906)]. Artist: G. Condy.

locule. Berry globose, ± 5 mm in diameter, 2- or 3-seeded; seeds somewhat kidney-shaped, flattened. Figure 17.

Vines; fairly common in wooded areas of the eastern Cape to tropical (mainly eastern) Africa. Map 56.

The dried roots of *Smilax officinalis* H.B.K. contain, besides gum and starch, a peculiar substance known under several

names, amongst others *sarsaparilla* which can be obtained in crystalline form from an alcoholic extract of the root, soluble in water. It is used in medicine and in what is known as a soft drink in America.

Vouchers: Bolus 10333; Elan Puttick 241; Flanagan 2619; Fourie 292; Hemm 70A; Killick 607; Kluge 6; Moll 2300; Venter 807; Ward 3047.

REFERENCES

- BAKER, J.G. 1875. Monocotyledones Petaloideae. *Transactions of the Linnean Society of London* 29: 151–163, t. 106.
 BAKER, J.G. 1896. *Smilax*. In W.T. Thiselton-Dyer, *Flora capensis* 6: 256. Reeve, London.
 BAKER, J.G. 1898. *Smilax*. In W.T. Thiselton-Dyer, *Flora of tropical Africa* 7: 423–425. Reeve, London.
 COODE, M.J.E. 1978. *Smilax*. In J. Bosser, Th. Cadet, H.R. Julien & W. Marais (eds), *Flore des Mascareignes* 183: 2–3. M.S.I.R.I., O.R.S.T.O.M. & Royal Botanic Gardens, Kew.
 COWLEY, E.J. 1989. Smilacaceae. In R.M. Polhill (ed.), *Flora of tropical east Africa*: 2. Balkema, Rotterdam.
 DE CANDOLLE, A.L.P.P. 1878. Smilacaceae. In A.L.P.P. de Candolle & A.C.P. de Candolle, *Monographiae phanerogamarum* 1: 39–217. Paris.
 DYER, R.A. 1976. *The genera of southern African flowering plants* 2. Agricultural and Technical Services, Pretoria.
 GARCKE, A. 1861–64. Coronariae. In W.C.H. Peters, *Naturwissenschaftliche Reise nach Mossambique*, Part 6, Botanik: 518–521. Reimer, Berlin.
 HUTCHINSON, J. 1959. *The families of flowering plants II: Monocotyledons*, edn 2. Clarendon, Oxford.
 KRAUSE, K. 1930. Smilacoideae. *Die natürlichen Pflanzenfamilien*, edn 2, 15a: 381–386.
 KRAUSS, F. 1845. *Flora* No. 28: 312. Regensburg.
 KUNTH, C.S. 1850. *Enumeratio plantarum* 5. Cotta, Stuttgart & Tübingen.
 LINNAEUS, C. 1753. *Species plantarum*, edn 1. Salvii, Stockholm.
 WATT, J.M. & BREYER-BRANDWIJK, M.G. 1962. *Medicinal and poisonous plants of southern and eastern Africa*, edn 2. Livingstone, Edinburgh & London.
 WILLDENOW, C.L. 1806. *Species plantarum*. Berlin.
 WOOD, J.M. 1906. *Natal plants* 4. Bennett & Davis, Durban.

INDEX *

- Adenogramma teretifolia* (Thunb.) Adams., 68
Aletris fragrans L., 3
Aletris guineensis (L.) Jacq., 5
Aletris hyacinthoides (L.) L., 5
 var. *guineensis* (L.) L., 5
Aloe hyacinthoides L., 5
 var. *guineensis* L., 5
 ASPARAGACEAE, 11
Asparagopsis (Kunth) Kunth, 11
 aethiopica (L.) Kunth, 54
 consanguinea Kunth, 80
 decumbens (Jacq.) Kunth, 79
 densiflora Kunth, 49
 denudatus Kunth, 36
 dregei Kunth, 38
 floribunda Kunth, 47
 juniperina Kunth, 68
 krebsiana Kunth, 52
 lamarckii Kunth, 36
 lancea (Thunb.) Kunth, 54
 microrhaphis Kunth, 59
 minutiflora Kunth, 64
 niveniana (Schult.) Kunth, 38
 passerinoides Kunth, 23
 pilosa (Bak.) Oberm., 68
 retrofracta (L.) Kunth, 39
 scandens (Thunb.) Kunth, 79
 schlechtendalii Kunth, 80
 setacea auct. non Kunth, 59
 setacea Kunth, 58
 spinescens (Steud.) Kunth, 27
 stipulacea (Lam.) Kunth, 24
 subquadrangularis Kunth, 54
 thunbergii Kunth, 38
 triacanthus (Burm. f.) Kunth, 23
 triacanthus (Roem. & Schult.) Kunth, 25
 zeyheri Kunth, 25
Asparagus L., 11
 sect. *Africani* Bak., 15
 sect. *Africani* sensu Jessop, 18
 sect. *Asparagopsis* Kunth, 11
 sect. *Capenses* Bak., 13
 sect. *Crispi* Jessop, 16
 sect. *Declinati* Bak., 14, 15, 16, 18
 sect. *Exuviali* Jessop, 16
 sect. *Falcati* Bak., 16
 sect. *Myrsiphyllum* (Willd.) Bak., 71
 sect. *Racemosi* Bak., 16
 sect. *Racemosi* sensu Jessop, 16, 18
 sect. *Striati* Bak., 19
 sect. *Thunbergiani* Bak., 15, 18
 sect. *Umbellati* Bak., 15, 19
 abyssinicus auct. non Hochst. ex A. Rich., 37
 acocksii Jessop, 57
 aethiopicus L., 53
 var. *angusticladus* Jessop, 56
 var. *natalensis* Bak., 56
 var. *ternifolius* auct. non Bak., 56
 var. *ternifolius* Bak., 49
 africanus auct. non Lam., 33
 africanus Lam., 36
 var. *concinus* Bak., 61
 var. *microphyllus* Bak., 39
 var. *pubescens* Bak., 39
 var. *wrightii* Bak., 37
 albus auct. non L., 38
 asiaticus auct. non L., 35
 asparagoides auct. non Druce, 77
 asparagoides (L.) Druce, 73
 asparagoides (L.) Wight, 73
 asparagoides sensu Jessop, 73, 75, 76
 aspergillus Jessop, 53, 56
 bechuanicus Bak., 33
 buchananii Bak., 45
 burchellii Bak., 27
 burkei Bak., 35
 capensis auct. non L., 38
 capensis L., 23
 compactus Salter, 37
 concinus (Bak.) Kies, 61
 confertus Krause, 51
 conglomeratus Bak., 35, 58
 consanguineus (Kunth) Bak., 80
 cooperi Bak., 35
 crassicladus Jessop, 57
 crispus Lam., 78
 cuscutoides Burch. ex Bak., 68
 declinatus auct. non L., 58
 decumbens Jacq., 79
 densiflorus (Kunth) Jessop, 49
 densus Soland. ex Bak., 24
 denudatus auct. non Kunth, 37
 denudatus (Kunth) Bak., 36
 var. *fragilis* Bak., 68
 dependens auct. non Thunb., 40
 dependens sensu Ecklon, 40
 dependens Thunb., 36
 dinteri Engl. & Krause, 35
 ecklonii Bak., 43
 engleri Krause, 65
 erectus (L.f.) Thunb., 65
 exuvialis Burch., 16

* Synonyms are in italics.

- falcatus* L., 45
 var. *ternifolius* sensu Jessop, 16
fasciculatus Thunb., 80
fleckii Schinz, 35
flexuosus Thunb., 79
francisci Krause, 35
glaucus Kies, 23
hereroensis Schinz, 43
intangibilis Dinter, 25
judtii Schinz, 35
juniperinus, 36
juniperoides Engl., 78
klingshardianus Dinter, 77
krausianus (Kunth) MacBride, 76
krausii Bak., 76
krebsianus (Kunth) Jessop, 52
kuisibensis Dinter, 75
lanceus Thunb., 54
laricinus Burch., 33
lignosus Burm. f., 37
longicladus N.E. Br., 36
lugardii Bak., 35
macowanii Bak., 62
 var. *zuluensis* (N.E. Br.) Jessop, 62
medeoloides (L.f.) Thunb., 75
 var. *angustifolius* (Mill.) Bak., 73
 var. *falciformis* (Kunth) Bak., 75
microphyllus (Bak.) Kies, 39
microrhaphis auct. non (Kunth) Oberm., 61
microrhaphis (Kunth) Bak., 59
minutiflorus (Kunth) Bak., 64
mucronatus Jessop, 38
multiflorus Bak., 39
multituberosus R.A. Dyer, 73
myriocladus Bak., 49
namaensis Schinz, 39
nelsii Schinz, 48
nelsonii Bak., 23
nivenianus Schult., 38
nodosus Soland. ex Bak., 68
obermeyeræ Jessop, 53
omahekensis Krause, 25
ovatus Salter, 75
oxyacanthus Bak., 48
patens Krause, 35
pearsonii Kies, 37
pectinatus Del., 79
pilosus Bak., 68
planiusculus Burm. f., 68
plumosus auct. non Bak., 58
plumosus Bak., 58, 59
racemosus auct. non Willd., 54
racemosus Willd., 16, 45
 var. *decipiens* Bak., 54
 var. *tetragonus* auct. non Willd., 52
 var. *tetragonus* (Bresler) Bak., 54
ramosissimum Bak., 79
retrofractus L., 15, 39
rigidus Jessop, 64
rivalis Burch. ex Kies, 35
ruber Burm. f., 38
rubicundus Berg., 38
sarmentosus auct. non L., 49
sarmentosus var. *comatus* Bak., 49
sarmentosus var. *densiflorus* (Kunth) Bak., 49
sarmentosus var. *kunthii* Bak., 54
saundersiae Bak., 47
scandens Thunb., 76, 79
 var. *deflexus* Bak., 80
schroederi Engl., 53
setaceus (Kunth) Jessop, 18, 58, 59
spinescens Steud. ex Roem. & Schult., 27
spinosissimus Kuntze, 25
sprengeri Regel, 49
stellatus Bak., 61
stipulaceus auct. non Lam., 27
stipulaceus Lam., 24
 var. *spinescens* Steud. ex Roem. & Schult., 27
stipularis?, 43
striatus De Wild., 53
striatus (L.f.) Thunb., 19, 64
 var. *dregei* Bak., 65
 var. *linearifolius* Bak., 65
 var. *zeyheri* Bak., 65
striatus Thunb., 53
suaveolens auct. non Burch., 27
suaveolens Burch., 25
subulatus Thunb., 65
ternifolius (Bak.) Hook. f., 49
tetragonus auct. non Bresler, 49
tetragonus Bresler, 54
thunbergianus Schult., 38
triacanthus Burm. f., 23
triacanthus Willd. ex Roem. & Schult., 25
undulatus (L.f.) Thunb., 77
 var. *rugosus* Bak., 68
virgatus Bak., 31
 var. *capillaris* Bak., 31
volubilis Thunb., 76
wildemanii Weim., 53
zuluensis N.E. Br., 62
 BEHNIA *Didr.*, 83
 reticulata (*Thunb.*) *Didr.*, 83
Brehnia Bak., 83
Cordyline Planch.; auct. non Comm. ex Juss., 1
 reflexa (Lam.) Planch., 1
 rumphii Hook., 3
Dictyopsis Harv., 83
thunbergii Harv., 83
 DRACAENA L., 1

- aletriformis* (Haw.) Bos, 3
draco (L.) L., 1
erecta L.f., 65
fragrans (L.) Ker-Gawl., 1
hookeriana K. Koch, 3
latifolia Regel, 3
mannii Bak., 3
medeoloides L.f., 75
nitens Welw. ex Bak., 3
reflexa Lam., 1
 var. *nitens* (Welw. ex Bak.) Bak., 3
rumphii (Hook.) Regel, 3
striata L.f., 64
transvaalensis Bak., 3
undulata L.f., 77
usambarensis Engl., 3
volubilis L.f., 76
DRACAENACEAE, 1
Draco hookeriana (K. Koch) Kuntze, 3
Elide Medik., 75
Hecatris Salisb., 71
 asparagoides (L.) Salisb., 73
Hylonome reticulata (Thunb.) Bak., 83
LUZURIAGACEAE, 83
Medeola angustifolia Mill., 73
 asparagoides L., 71, 73
MYRSIPHYLLUM Willd., 71
 alopecurum Oberm., 78
 angustifolium (Mill.) Willd., 73
 asparagoides (L.) Willd., 71, 73
 declinatum (L.) Oberm., 78
 erectum (L.f.) Kunth, 65
 falciforme Kunth, 75
 fasciculatum (Thunb.) Oberm., 80
 gramineum Kunth, 76
 juniperoides (Engl.) Oberm., 78
 kraussianum Kunth, 76
 multituberosum (R.A. Dyer) Oberm., 73
 ovatum (Salter) Oberm., 75
 ramosissimum (Bak.) Oberm., 79
 scandens (Thunb.) Oberm., 79
 striatum (L.f.) Kunth, 64
 undulatum (L.f.) Kunth, 77
 volubile (Thunb.) Oberm., 76
Pleomele Salisb., 1
 fragrans (L.) Salisb., 1
 hookeriana (K. Koch) N.E. Br., 3
 nitens (Welw. ex Bak.) N.E. Br., 3
 usambarensis (Engl.) N.E. Br., 3
PROTASPARAGUS Oberm., 11
 series *Africani* (Bak.) Oberm., 15
 series *Exuviali* Oberm., 16
 series *Globosi* Oberm., 18
 series *Penduli* Oberm., 14
 series *Protasparagus*, 16
 series *Racemosi* (Bak.) Oberm., 16
 series *Retrofracti* Oberm., 15
 series *Suaveolens* Oberm., 13
 series *Sympodioidi* Oberm., 19
 subg. *Protasparagus*, 14
 subg. *Suaveolens* Oberm., 13
 acocksii (Jessop) Oberm., 57
 aethiopicus (L.) Oberm., 11, 54
 africanus (Lam.) Oberm., 35
 aggregatus Oberm., 55
 angusticladus (Jessop) Oberm., 56
 aspergillus (Jessop) Oberm., 56
 bayeri Oberm., 21
 bechuanicus (Bak.) Oberm., 33
 biflorus Oberm., 63
 buchananii (Bak.) Oberm., 45
 burchellii (Bak.) Oberm., 27
 capensis (L.) Oberm., 23
 var. *capensis*, 23
 var. *litoralis* Suess., 24
 clareae Oberm., 54
 coddii Oberm., 53
 compactus (Salter) Oberm., 37
 concinus (Bak.) Oberm. & Immelman, 61
 confertus (Krause) Oberm., 51
 cooperi (Bak.) Oberm., 33
 crassicladus (Jessop) Oberm., 57
 densiflorus (Kunth) Oberm., 49
 cv. *Meyersii*, 49
 cv. *Sprengeri*, 49
 denudatus (Kunth) Oberm., 36
 devenishii Oberm., 41
 divaricatus Oberm., 67
 edulis Oberm., 41
 exsertus Oberm., 29
 exuvialis (Burch.) Oberm., 16, 42
 forma *exuvialis*, 43
 forma *ecklonii* (Bak.) Oberm., 43
 falcatus (L.) Oberm., 43
 filicladus Oberm., 51
 flavicaulis Oberm., 29
 subsp. *flavicaulis*, 30
 subsp. *setulosus* Oberm., 30
 fouriei Oberm., 62
 fractiflexus Oberm., 40
 glaucus (Kies) Oberm., 23
 graniticus Oberm., 42
 intricatus Oberm., 65
 krebsianus (Kunth) Oberm., 51
 laricinus (Burch.) Oberm., 33
 lignosus (Burm. f.) Oberm., 37
 longicladus (N.E. Br.) B. Mathew, 36
 lynetteae Oberm., 47
 macowanii (Bak.) Oberm., 62
 mariae Oberm., 24

microrhaphis (Kunth) Oberm., 59
minutiflorus (Kunth) Oberm., 64
mollis Oberm., 32
mucronatus (Jessop) Oberm., 38
multiflorus (Bak.) Oberm., 39
natalensis (Bak.) Oberm., 56
nelsii (Schinz) Oberm., 48
nodulosus Oberm., 59
oliveri Oberm., 30
oxyacanthus (Bak.) Oberm., 48
pearsonii (Kies) Oberm., 37
pendulus Oberm., 14, 32
plumosus (Bak.) Oberm., 59
racemosus (Willd.) Oberm., 16, 45
recurvispinus Oberm., 19
retrofractus (L.) Oberm., 15, 39
rigidus (Jessop) Oberm., 64
rubicundus (Berg.) Oberm., 38
schroederi (Engl.) Oberm., 53
sekukuniensis Oberm., 63
setaceus (Kunth) Oberm., 18, 58
spinescens (Steud. ex Roem. & Schult.) Oberm., 27
stellatus (Bak.) Oberm., 61
stipulaceus (Lam.) Oberm., 24
striatus (L.f.) Oberm., 19, 64
suaveolens (Burch.) Oberm., 25
subulatus (Thunb.) Oberm., 65
transvaalensis Oberm., 52

virgatus (Bak.) Oberm., 31
Ruscus reticulatus Thunb., 83
volubilis Thunb., 76
SANSEVIERIA Thunb., 5
aethiopica Thunb., 7
angustiflora Lindb., 5
caespitosa Dinter, 7
desertii N.E. Br., 8
grandis Hook. f., 5
 var. *zuluensis* N.E. Br., 5
guineensis (L.) Willd., 5
hyacinthoides (L.) Druce, 5
longiflora Sims, 7
paniculata Schinz, 3
pearsonii N.E. Br., 8
scabrifolia Dinter, 7
thyrsiflora Petagna, 5
thyrsiflora (Petagna) Thunb., 5
zeylanica auct. not Willd., 7
Schizobasis cuscutoides (Burch. ex Bak.) Benth., 68
SMILACACEAE, 85
SMILAX L., 85
 anceps Willd., 85
 foliolus L., 85
 kraussiana Meisn., 85
 mossambicensis Garcke, 85
 officinalis H.B.K., 86
Yucca aletiformis Haw., 3

SMITHSONIAN INSTITUTION LIBRARIES



3 9088 01423 4272